ANDERSON

FORT SAM HOUSTON NATIONAL CEMETERY

PHASE III EXPANSION & IMPROVEMENTS

ADDITIONAL ROAD REPAIRS| BID DOCUMENTS

1520 Harry Wurzbach Rd.
San Antonio, TX 78209

SPECIFICATIONS

AE COMM. #16645
VA PROJECT #846CM2045
TASK ORDER # 36C10F19N00331
August 1, 2025

13605 1st Ave. N #100 Plymouth, Minnesota 55441
P 763.412.4000 **F** 763.412.4090 **ae-mn**.com

VA | U.S. Department of Veterans Affairs

DEPARTMENT OF VETERANS AFFAIRS

NCA MASTER SPECIFICATIONS

TABLE OF CONTENTS
Section 00 01 10

	DIVISION 00 - SPECIAL SECTIONS	
00 01 15	List of Drawing Sheets	
	DIVISION 01 - GENERAL REQUIREMENTS	
01 00 01	General Requirements (NCA Projects)	
01 32 16.13	Network Analysis Schedules	
01 33 23	Shop Drawings, Product Data, and Samples	
01 35 26	Safety Requirements	
01 45 00	Quality Control	
01 45 29	Testing Laboratory Services	
01 57 19	Temporary Environmental Controls	
01 74 19	Construction Waste Management	
	DIVISION 02 - EXISTING CONDITIONS	
02 41 10	Demolition and Site Clearing	
	DIVISION 03 - CONCRETE	
03 30 53	(Short-Form) Cast-in-Place Concrete	
	DIVISION 31 - EARTHWORK	
31 20 00	Earth Moving	
31 23 19	Dewatering	
	DIVISION 32 - EXTERIOR IMPROVEMENTS	
32 05 23	Cement and Concrete for Exterior Improvements	
32 12 16	Asphalt Paving	
32 17 23	Pavement Markings	
32 33 00	Site Furnishings	
APPENDIX	**APPENDIX**	
A	Geotechnical Report - Fort Sam Houston	

DISCIPLINE SIGNATURES

Project Manager/Civil Engineer
Eric Sautbine - Anderson Engineering

STAMP

SECTION 00 01 15
LIST OF DRAWING SHEETS

The drawings listed below accompanying this specification form a part of the contract.

SHEET	TITLE	
GENERAL		
GI100	COVER SHEET	1
GC100	EXISTING ROADS - SITE MAP	2
BASE BID		
VF101	SURVEY ENLARGEMENT 1 - WEST CEMETARY	3
VF102	SURVEY ENLARGEMENT 2 - WEST CEMETARY	4
VF103	SURVEY ENLARGEMENT 3 - WEST CEMETARY	5
CP101	PLAN & PROFILE - AUTIN LOOP (STA. 0+00-9+75)	6
CP102	PLAN & PROFILE - AUTIN CIRCLE (STA. 0+00-4+69)	7
CP103	PLAN & PROFILE - MEDINA LOOP (STA. 0+00-6+60)	8
CS501	SITE DETAILS	9
BID OPTION 1		
CD101	DEMOLITION PLAN - SAN ANTIONO BLVD	10
CG101	PLAN & PROFILE - SAN ANTIONO BLVD (STA. -0+10-4+80)	11

- - - END - - -

SECTION 01 00 01
GENERAL REQUIREMENTS (MAJOR NCA PROJECTS)

TABLE OF CONTENTS

SECTION 01 00 01
GENERAL REQUIREMENTS

1.1 GENERAL INTENTION

A. Completely prepare site for building operations, including demolition and removal of existing structures, furnish labor and materials and perform work for Fort Sam Houston National Cemetery Phase 3 Additional Road Repairs Project as required by drawings and specifications.

B. Visits to the site by Bidders may be made only by appointment with the Contracting Officer.

C. Offices of Anderson Engineering, as Architect-Engineers, will render certain technical services during construction. Such services will be considered as advisory to the Government and will not be construed as expressing or implying a contractual act of the Government without affirmations by Senior Resident Engineer or Contracting Officer (SRE/CO).

D. All Testing Laboratory services will be retained and paid for by the Contractor (see Spec. Section 01 45 29 TESTING LABORATORY SERVICES). However, the Department of Veterans Affairs may elect to retain its own Testing Laboratory for any purpose. Before placement and installation of work subject to tests by testing laboratory retained by Department of Veterans Affairs, notify the SRE/CO in sufficient time to enable testing laboratory personnel to be present at the site in time for proper taking and testing of specimens and field inspection. Such prior notice will not be less than three working days unless otherwise designated by the SRE/CO.

E. All employees of general Contractor and subcontractors will comply with VA security management program.

F. Prior to commencing work, General Contractor will provide proof that an OSHA certified “competent person” (CP) as defined in 29 CFR 1926.20(b)(2) will maintain a presence at the work site whenever the General Contractor or subcontractors are present.

G. Training:

1. All employees of General Contractor or subcontractors having supervisory responsibilities will have the 30-hour OSHA certified Construction Safety course and/or other relevant competency training, as determined by VA CP.
2. All other employees of General Contractor or subcontractors will have the 10-hour OSHA certified Construction Safety course and/or other relevant competency training. Relevant competency training will be as determined acceptable by the VA CP.
3. Submit training records of all such employees for approval before the start of work.

1.2 STATEMENT OF BID ITEM(S)

A. CLIN 001: Repair of existing roads Austin Circle, Austin Loop, and Medina Loop to include, but not limited to, demolition of curb/gutter and pavement, survey and grading, Stormwater Pollution Prevention Plan measures, road construction, curb/gutter placement. Include all general requirements, Overhead & Profit, bonding, insurance, etc.

B. Bid Option 1: Repair of existing section of San Antonio Boulevard to include, but not limited to, demolition of curb/gutter and pavement, survey and grading, Stormwater Pollution Prevention Plan measures, road construction, curb/gutter placement. Include all general requirements, Overhead & Profit, bonding, insurance, etc.

1.3 SPECIFICATIONS AND DRAWINGS FOR CONTRACTOR

A. AFTER AWARD OF CONTRACT, 1 full-sized, 2 half-sized drawing sets and 1 set of specifications will be furnished to the Contractor, as well as an electronic set of plans and specifications.

B. Additional sets of drawings may be made by the Contractor at the Contractor's expense.

1.4 CONSTRUCTION SECURITY REQUIREMENTS

A. Security Plan:

1. The security plan defines both physical and administrative security procedures that will remain effective for the entire duration of the project.

2. Assure that all subcontractors working on the project and their employees also comply with these regulations. Dismissal of violators may be directed by the SRE/CO.

B. Security Procedures:

1. For working outside the "regular hours" as defined in the contract, give 3 days' notice to the SRE/CO so that security arrangements can be provided for the employees. This notice is separate from any notices required for utility shutdown described later in this section.
2. No photography of VA premises is allowed without written permission from the SRE/CO.
3. VA reserves the right to close or shut down the project site and order Contractor's employees off the premises in the event of a national emergency. Return to the site only with the written approval of the SRE/CO.

C. Key Control:

1. Provide duplicate keys and lock combinations to the SRE/CO for the purpose of security inspections of every area of project including toolboxes and parked machines and to take any emergency action(s).
2. Turn over all permanent lock cylinders to the VA locksmith for permanent installation. Coordinate the lock cylinder and key system work and provide the devices required to comply with the facility security system. See Section 08 71 00, DOOR HARDWARE and coordinate.

D. Document Control:

1. Before starting any work, submit an electronic security memorandum, from the Contractor and each subcontractor describing the actions to be performed to achieve the goals of maintaining confidentiality of "sensitive information".
2. Perform safekeeping procedures for all drawings, project manual and other project information. This information will be shared only with those with a specific need to accomplish the project.
3. Certain documents, sketches, videos or photographs and drawings may be marked "Law Enforcement Sensitive" or "Sensitive Unclassified". Secure such information in separate containers and limit access to only those who will need it for the project. Return the information to the SRE/CO upon request.

4. These security documents will not be removed or transmitted from the project site without the written approval of the SRE/CO.
5. All paper waste or electronic media will be shredded and destroyed in a manner acceptable to the VA.
6. Notify SRE/CO immediately when there is a loss or compromise of "sensitive information".
7. All electronic information will be stored in a specified location following VA standards and procedures using an Engineering Document Management Software (EDMS).
   a. Security, access and maintenance of all project drawings, both scanned and electronic will be performed and tracked through the EDMS system.
   b. "Sensitive information" including drawings and other documents may be attached to e-mail provided all VA encryption procedures are followed.

E. Motor Vehicle Restrictions
1. Vehicle authorization requests will be required for any vehicle entering the site and such requests will be submitted 24 hours before the date and time of access. Access will be restricted to picking up and dropping off materials and supplies.

1.5 FIRE SAFETY

A. Applicable Publications: Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

1. American Society for Testing and Materials (ASTM):

E84-2013	Surface Burning Characteristics of Building Materials

2. National Fire Protection Association (NFPA):

10-2013	Standard for Portable Fire Extinguishers
30-2012	Flammable and Combustible Liquids Code
51B-2014	Standard for Fire Prevention During Welding, Cutting and Other Hot Work
70-2011	National Electrical Code
241-2013	Standard for Safeguarding Construction, Alteration, and Demolition Operations

3. Occupational Safety and Health Administration (OSHA):
   29 CFR 1926 Safety and Health Regulations for Construction

B. Fire Safety Plan: Establish and maintain a fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare a plan detailing project-specific fire safety measures, including periodic status reports, and submit to SRE/CO/Cemetery Director for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. Prior to any worker for the Contractor or subcontractor's beginning work, they will undergo a safety briefing provided by the Contractor's competent person per OSHA requirements. This briefing will include information on the construction limits, safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of NCA equipment, etc. Documentation will be provided to the SRE/CO that individuals have undergone the Contractor's safety briefing.

C. Site and Building Access: Maintain free and unobstructed access to emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.

D. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6 m (20 feet) exposing overall length, separate by 10 feet.

E. Temporary Construction Partitions:
   1. Install and maintain temporary construction partitions to provide smoke-tight separations between construction areas and adjoining areas. Construct partitions of gypsum board or treated plywood (flame spread rating of 25 or less in accordance with ASTM E84) on both sides of fire-retardant treated wood or metal steel studs. Extend the partitions through suspended ceilings to floor slab deck or roof. Seal joints and penetrations. At door openings, install Class C, 3/4-hour fire/smoke rated doors with self-closing devices.
   2. Install temporary construction partitions as shown on drawings to maintain integrity of existing exit passageways, fire-rated enclosures of hazardous areas, horizontal exits, smoke barriers, and opening enclosures.

F. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.

G. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with SRE/CO/Cemetery Director.

H. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to SRE/CO.

I. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.

J. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.

K. Existing Fire Protection: Do not impair automatic sprinklers, smoke and heat detection, and fire alarm systems, except for portions immediately under construction, and temporary connections. Request interruptions in accordance with Article 1.6, OPERATIONS AND STORAGE AREAS, and coordinate with SRE/CO. All existing or temporary fire protection systems (fire alarms) located in construction areas will be tested as coordinated with the SRE/CO. Parameters for the testing and results of any tests performed will be recorded by the Contractor and copies provided to the SRE/CO.

L. Smoke Detectors: Prevent accidental operation. Remove temporary covers at the end of work operations each day. Coordinate with SRE/CO.

M. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with SRE/CO. Obtain permits from SRE/CO at least 48 hours in advance. Designate the Contractor's responsible project-site fire prevention program manager to permit hot work.

N. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to SRE/CO.

O. Smoking: Smoking is prohibited in and adjacent to construction areas inside existing buildings and additions under construction. In separate and detached buildings under construction, smoking is prohibited except in designated smoking rest areas.

P. Dispose of waste and debris in accordance with NFPA 241 and Construction Waste Management Plan required under Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT. Remove from buildings daily.

Q. Perform other construction, alteration and demolition operations in accordance with 29 CFR 1926.

1.6 OPERATIONS AND STORAGE AREAS

A. The Contractor will confine all operations (including storage of materials) on Government premises to areas authorized or approved by the SRE/CO. The Contractor will hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.

B. Temporary buildings (e.g., storage trailers, office trailers) and utilities may be erected by the Contractor only with the approval of the SRE/CO and will be built with labor and materials furnished by the Contractor without the expense to the Government. The temporary buildings and utilities will remain the property of the Contractor and will be removed by the Contractor at its expense upon completion of the work. With the written consent of the SRE/CO, the buildings and utilities may be abandoned and need not be removed.

C. The Contractor will, under regulations prescribed by the SRE/CO, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the SRE/CO. When materials are transported in prosecuting the work, vehicles will not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor will protect them from damage. The Contractor will repair or pay for the repair of any damaged curbs, sidewalks, or roads. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee will be the responsibility of the Government and not the Contractor.

D. Working space and space available for storing materials will be as determined by the SRE/CO.

E. Workmen are subject to rules of the Cemetery regarding their conduct and dress code.

F. Execute work so as to interfere as little as possible with normal functioning of Cemetery as a whole, including operations of utility

services, fire protection systems and any existing equipment, and with work being done by others.

1. Do not store materials and equipment in other than assigned areas.
2. Schedule delivery of materials and equipment to immediate construction areas within buildings in use by the Department of Veterans Affairs in quantities sufficient for not more than two work days. Provide unobstructed access, for the Cemetery personnel, to areas that are required to remain in operation during the construction of the project.
3. Where access by Cemetery personnel to vacated portions of buildings is not required, storage of Contractor's materials and equipment will be permitted subject to fire and safety requirements. All such actions will be coordinated with the Utility Company involved and the SRE/CO.
4. Work may be subject to curtailment during funeral services. The Contractor will be required to coordinate all work activities with the SRE/CO office to avoid impact to visitors.

G. Phasing: To insure such executions, furnish the SRE/CO with a schedule of approximate dates on which the Contractor intends to accomplish work in each specific area of site, building or portion thereof. In addition, notify the SRE/CO two weeks in advance of the proposed date of starting work in each specific area of site, building or portion thereof.

H. Building(s) will be occupied during performance of work; but immediate areas of alterations will be vacated.

1 Take all measures and provide all material necessary for protecting existing equipment and property in affected areas of construction against dust and debris, so that equipment and affected areas to be used in the Cemetery’s operations will not be hindered. Permit access to Department of Veterans Affairs personnel through other construction areas which serve as routes of access to such affected areas and equipment. Coordinate alteration work in areas occupied by Department of Veterans Affairs so that Cemetery operations will continue during the construction period.

I. When a building or site is turned over to Contractor, it is accepted in entirety and responsibility therefore includes, but is not limited to the following:

1. Maintain a minimum temperature of 40 degrees F at all times, except as otherwise specified.
2. Maintain in operating condition existing fire protection and alarm equipment. In connection with fire alarm equipment, make arrangements for pre-inspection of the site with Fire Department or Company (Department of Veterans Affairs or municipal) whichever will be required to respond to an alarm from the Contractor's employee.

J. Utilities Services: Maintain existing utility services for the Cemetery at all times. Meet with the RE and appropriate Cemetery operations staff to walk the proposed work areas and discuss any known or potential underground systems that are indicated or not shown on the construction drawings, prior to starting the work.

1. Provide an underground utility locating service to locate any existing underground lines or other underground facilities within his work area that are to remain in service. Any new information not clearly indicated on the bid documents will be passed on to the Contractor's underground locating service staff. Any new information discovered by the underground locating service staff will be turned over to the SRE/CO for dissemination to the Cemetery Staff.

L. Provide temporary facilities, labor, materials, equipment, connections, and utilities to assure uninterrupted services. Where necessary to cut existing water, sewer or air pipes, or conduits, wires, cables, etc. of utility services or of fire protection systems and communications systems (including telephone), they will be cut and capped at suitable places where shown; or, in absence of such indication, where directed by the SRE/CO.

1. No utility service such as water, gas, steam, sewers or electricity, or fire protection systems and communications systems may be interrupted without prior approval of the SRE/CO. Electrical work will be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished, work on any energized circuits or equipment will not commence without the SRE/CO, and Cemetery Director’s prior knowledge and written approval. Refer to specification Sections 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, 27 05 11 REQUIREMENTS FOR COMMUNICATIONS

INSTALLATIONS and 28 05 11, REQUIREMENTS FOR ELECTRONIC SAFETY AND SECURITY INSTALLATIONS for additional requirements.

2. Submit a request to interrupt any such services to SRE/CO, and Cemetery Director, in writing, 72 hours in advance of proposed interruption. Request will state reason, date, exact time of, and approximate duration of such interruption.
3. The Contractor will be advised (in writing) of approval of request, or of which other date and/or time such interruption will cause least inconvenience to operations of the Cemetery. Interruption time approved by the Cemetery may occur at other than Contractor's normal working hours at no additional cost to the Government.
4. Major interruptions of any system must be requested, in writing, at least 15 calendar days prior to the desired time and will be performed as directed by the SRE/CO, which may require the work to be performed off hours which will be done at no additional cost to the Government.
5. In case of a contract construction emergency, service will be interrupted on approval of SRE/CO. Such approval will be confirmed in writing as soon as practical.
6. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee will be the responsibility of the Government and not the Contractor.

M. Abandoned Lines: All service lines such as wires, cables, conduits, ducts, pipes and the like, and their hangers or supports, which are to be abandoned but are not required to be entirely removed, will be sealed, capped or plugged. The lines will not be capped in finished areas but will be removed and sealed. Lines will be capped or plugged in ceilings, within furred spaces, in unfinished areas, or within walls or partitions; so that they are completely behind the finished surfaces.

N. To minimize interference of construction activities with flow of Cemetery traffic, comply with the following:

1. Keep roads, walks and entrances to the grounds, parking, to occupied areas of buildings clear of construction materials, debris and standing construction equipment and vehicles. Wherever excavation

for new utility lines cross existing roads, at least one lane must be open to traffic at all times.

2. Method and scheduling of required cutting, altering and removal of existing roads, walks and entrances must be approved by the SRE/CO.

O. Coordinate the work for this contract with other construction operations as directed by SRE/CO.

P. Coordination of Construction with Cemetery Director: The burial activities at the National Cemetery will take precedence over construction activities. Cooperation and coordination with the Cemetery Director, through the SRE/CO, in arranging construction schedule to cause the least possible interference with Cemetery activities in actual burial areas, is required. Construction noise during the interment services will not disturb the service. Coordination of work may require that equipment that is heard from the service location be shut-off, or moved out of the area prior to the service, as acceptable to the Cemetery Director through the SRE/CO. Trucks and workmen will not pass through the service area during this period:

1. Discontinue work sufficiently in advance of Easter Sunday, Mother's Day, Father's Day, Memorial Day, Veteran's Day and/or Federal holidays, and clean up all areas of operation adjacent to functioning areas of the Cemetery, including existing burial sections and any other areas identified by the SRE/CO before these dates.
2. Clean-up activities will include the removal of all equipment, tools, materials and debris and leaving the areas in a clean, neat condition.

1.7 ALTERATIONS

A. Survey: Before any work is started, make a thorough survey with the SRE/CO of areas of buildings in which alterations are to occur and areas which are anticipated routes of access. Create and furnish a written report to the SRE/CO. This report will list by rooms and spaces:

1. Existing condition and types of resilient flooring, doors, windows, walls and other surfaces not required to be altered throughout affected areas of building.
2. Existence and conditions of items such as plumbing fixtures and accessories, electrical fixtures, equipment, venetian blinds,

shades, etc., required by drawings to be either reused or relocated, or both.

3. Will note any discrepancies between drawings and existing conditions at site.
4. Will designate areas for working space, materials storage and routes of access to areas within buildings where alterations occur and which have been agreed upon by Contractor and SRE/CO.

B. Any items required by drawings to be either reused or relocated or both, found during this survey to be nonexistent, or in opinion of SRE/CO, to be in such condition that their use is impossible or impractical, will be furnished and/or replaced by the Contractor with new items in accordance with specifications which will be furnished by the Government. Provided the contract work is changed by reason of this subparagraph B, the contract will be modified accordingly.

C. Re-Survey: Thirty days before expected partial or final inspection date, the Contractor and SRE/CO together will make a thorough re-survey of the areas of buildings involved. They will furnish a report on conditions then existing, of resilient flooring, doors, windows, walls and other surfaces as compared with conditions of same as noted in first condition survey report:

1. Re-survey report will also list any damage caused by the Contractor to such flooring and other surfaces, despite protection measures; and, will form the basis for determining extent of repair work required of the Contractor to restore damage caused by the Contractor's workmen in executing work of this contract.

D. Protection: Provide the following protective measures:

1. Wherever existing roof surfaces are disturbed they will be protected against water infiltration. In case of leaks, they will be repaired immediately upon discovery.
2. Temporary protection against damage for portions of existing structures and grounds where work is to be done, materials handled and equipment moved and/or relocated.
3. Protect the interior of existing structures at all times, from damage, dust and weather inclemency. Wherever work is performed, floor surfaces that are to remain in place will be adequately

protected prior to starting work, and this protection will be maintained intact until all work in the area is completed.

1.8 ENVIRONMENTAL CONTROLS

A. In general, following preventive measures will be adopted during construction to keep down dust and prevent mold.

1. Dampen debris to keep down dust and provide temporary construction partitions in existing structures where directed by SRE/CO. Block off ducts and diffusers to prevent circulation of dust into occupied areas during construction.

B. Vacuum and wet mop all transition areas from construction to the occupied Cemetery buildings at the end of each workday.

C. Final Cleanup:

1. Perform HEPA vacuum cleaning of all surfaces in the construction area as well as any adjoining areas that remained in service and were contaminated by dust from the work area. This included walls, ceilings, cabinets, furniture (built-in or free standing), partitions, flooring, etc.
2. Upon completion of the project, or as work progresses, remove all construction debris from above ceiling, vertical shafts and utility chases that have been part of the construction.
3. All new air ducts will be cleaned prior to final inspection.

1.9 DISPOSAL AND RETENTION

A. Materials and equipment accruing from work removed and from demolition of buildings or structures, or parts thereof, will be disposed of as follows:

1. Reserved items which are to remain property of the Government are identified by attached tags or noted on drawings or in specifications as items to be stored. Items that remain property of the Government will be removed or dislodged from present locations in such a manner as to prevent damage which would be detrimental to re-installation and reuse. Store such items where directed by SRE/CO.
2. Items not reserved will become property of the Contractor and be removed by Contractor from the National Cemetery.
3. Items of portable equipment and furnishings located in rooms and spaces in which work is to be done under this contract will remain the property of the Government. When rooms and spaces are vacated

by the Department of Veterans Affairs during the alteration period, such items which are NOT required by drawings and specifications to be either relocated or reused will be removed by the Government in advance of work to avoid interfering with Contractor's operation.

4. PCB Transformers and Capacitors: The Contractor will be responsible for disposal of the Polychlorinated Biphenyl (PCB) transformers and capacitors. The transformers and capacitors will be taken out of service and handled in accordance with the procedures of the Environmental Protection Agency (EPA) and the Department of Transportation (DOT) as outlined in Code of Federal Regulation (CFR), Titled 40 and 49 respectively. The EPA's Toxic Substance Control Act (TSCA) Compliance Program Policy Nos. 6-PCB-6 and 6-PCB-7 also apply. Upon removal of PCB transformers and capacitors for disposal, the "originator" copy of the Uniform Hazardous Waste Manifest (EPA Form 8700-22), along with the Uniform Hazardous Waste Manifest Continuation Sheet (EPA Form 8700-22A) will be returned to the SRE/CO who will annotate the contract file and transmit the Manifest to the Cemetery Director.

   a. Copies of the following listed CFR titles may be obtained from the Government Printing Office:

40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 761	PCB Manufacturing, Processing, Distribution in Commerce, and use Prohibitions
49 CFR 172	Hazardous Material tables and Hazardous Material Communications Regulations
49 CFR 173	Shippers - General Requirements for Shipments and Packaging
49 CRR 173	Subpart A General
49 CFR 173	Subpart B Preparation of Hazardous Material for Transportation
49 CFR 173	Subpart J Other Regulated Material; Definitions and Preparation

TSCA Compliance Program Policy Nos. 6-PCB-6 and 6-PCB-7

1.10 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS

A. Preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the work sites, which are not to be removed and which do not unreasonably interfere with the work required under this contract. Remove trees only when specifically authorized to do so, avoid damaging vegetation that will remain in place. If any limbs or branches of trees are broken during contract performance, or by the careless operation of equipment, or by workmen, then trim those limbs or branches with a clean cut and paint the cut with a tree-pruning compound as directed by the SRE/CO.

B. Protect from damage all existing improvements and utilities at or near the work site and on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. Repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the SRE/CO may have the necessary work performed and charge the cost to the Contractor.

C. Refer to Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS, for additional requirements on protecting vegetation, soils and the environment. Refer to Articles, "Alterations", "Restoration", and "Operations and Storage Areas" for additional instructions concerning repair of damage to structures and site improvements.

D. A National Pollutant Discharge Elimination System (NPDES) permit is required for this project. The Contractor is considered an "operator" under the permit and has extensive responsibility for compliance with permit requirements. VA will make the permit application available at the (appropriate NCA Central/Cemetery) office. The apparent low bidder, Contractor and affected subcontractors will furnish all information and certifications that are required to comply with the permit process and permit

requirements. Many of the permit requirements will be satisfied by completing construction as shown and specified. Some requirements involve the Contractor's method of operations and operations planning and the Contractor is responsible for employing best management practices. The affected activities often include, but are not limited to, the following:

1. Designating areas for equipment maintenance and repair;
2. Providing waste receptacles at convenient locations and provide regular collection of wastes;
3. Locating equipment wash down areas on site, and providing appropriate control of wash-waters;
4. Providing protected storage areas for chemicals, paints, solvents, fertilizers, and other potentially toxic materials; and
5. Providing adequately maintained sanitary facilities.

1.11 RESTORATION

A. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work. Except as otherwise shown or specified, do not cut, alter or remove any structural work, and do not disturb any ducts, plumbing, steam, gas, or electric work without approval of the SRE/CO. Existing work to be altered or extended and is found to be defective in any way, will be reported to the SRE/CO before it is disturbed. Materials and workmanship used in restoring work will conform in type and quality to that of original existing construction, except as otherwise shown or specified.

B. Upon completion of the contract, deliver work complete and undamaged. Existing work (walls, ceilings, partitions, floors, mechanical and electrical work, lawns, paving, roads, walks, etc.) disturbed or removed as a result of performing required new work, will be patched, repaired, reinstalled, or replaced with new work, and refinished and left in as good condition as existed before commencing work.

C. At the Contractor's own expense, immediately restore to service and repair any damage caused by the Contractor's workmen to any operational existing piping and conduits, wires, cables, etc. The above is applicable for all owner-operated systems with underground elements or those of utility services or of fire protection systems and communications systems (including telephone) which are indicated on

drawings, and which are not scheduled for discontinuance or abandonment.

D. Expense of repairs to such utilities and systems not shown on drawings or locations of which are unknown will be covered by adjustment to contract time and price.

1.12 PHYSICAL DATA

A. Data and information furnished or referred to below is for the Contractor's information. The Government will not be responsible for any interpretation of, or conclusion drawn from, the data or information by the Contractor.

B. Subsurface conditions have been developed by core borings and test pits. Logs of subsurface exploration are provided in the Geotechnical Engineering Report dated 5 May 2020 prepared by Terracon.

C. The Government does not guarantee that other materials will not be encountered nor that proportions, conditions or character of several materials will not vary from those indicated by explorations. Bidders are expected to examine the site of work and logs of borings and, after investigation, decide for themselves the character of materials and make their bids accordingly. Upon proper application to the Department of Veterans Affairs, bidders will be permitted to make subsurface explorations of their own at site.

1.13 PROFESSIONAL SURVEYING SERVICES

A. A registered professional land surveyor or registered civil engineer whose services are retained and paid for by the Contractor will perform services specified herein and in other specification sections. Provide a written certification to the SRE/CO that the land surveyor or civil engineer is not one who is a regular employee of the Contractor, and that the land surveyor or civil engineer has no financial interest in this contract.

1.14 LAYOUT OF WORK

A. The Contractor will lay out the work from Government established base lines and benchmarks indicated on the drawings and will be responsible for all measurements in connection with the layout. Furnish, at the Contractor's own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work.

Execute the work to the lines and grades that may be established or indicated by the SRE/CO. Maintain and preserve all stakes and other marks established by the SRE/CO until authorized to remove them. If such marks are destroyed by the Contractor or through Contractor's negligence before their removal is authorized, the SRE/CO may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

B. Establish and plainly mark drawing indicated layout reference lines for: lines for each gravesite control monument; locations for each sprinkler head within the burial section as detailed or at the point equal distance from the closest point on surrounding planned headstone locations; footings and foundations for columbarium and memorial walls and elements in their respective complexes; preplaced crypts; preplaced urn vaults and all such other lines and grades that are reasonably necessary to properly assure that location, orientation, and elevations established for each such structure and/or addition, and all other facilities to be constructed as part of the work for this project. The surveyed layout information will be accurate to the highest industry standards for the respective type of work, all in accordance with lines, orientation, locations and elevations shown on contract drawings.

C. Following completion of general mass excavation and before any other permanent work is performed, establish and plainly mark (through use of appropriate batter boards or other means) sufficient additional survey control points or system of points as may be necessary to assure proper alignment, orientation, and grade of all major features of work. The Survey will include, but not be limited to, location of lines and grades of footings, exterior walls, center lines of columns/piers in two directions, major utilities and elevations of floor slabs:

1. Such additional survey control points or system of points thus established will be checked and certified by a registered land surveyor or registered civil engineer. Furnish such certification to the SRE/CO before any work (such as footings, floor slabs, columns, walls, utilities and other major controlling features) are placed.
2. The forms for the concrete foundations, of the columbarium and/or memorial wall elements and complexes, where exposed in the final

installation, require tighter construction tolerances than for general foundations (See Drawings for the allowable tolerances). For the exposed foundations of these elements provide such additional survey points and elevations as are needed so a registered land surveyor or registered civil engineer can quickly check the work and provide the required certification(s) before concrete is poured. Contractor will install and adjust the forms sufficiently in advance of scheduling the concrete pour(s) so they can be checked and certified prior to concrete being poured. The required certification(s) by the registered surveyor or engineer to the Contractor and/or SRE/CO will be provided before concrete is poured in the forms. The signed certification(s) will identify the specific forms for which the certification is applicable, and will contain language that clearly indicated that the identified foundation forms for the portions of the work that will be exposed in the final installation, and to a depth below expansion joints where the foundations abut new rigid hardscape (concrete, stone, pavers, etc.) are at the correct location, correct dimensions, and correct orientation, and that the indicated pour elevations are correct, all according to the contract drawings, within the allowable construction tolerances of indicate the allowable construction tolerance for the dimensions, orientation, location and elevation of the forms for layout and elevation of this work. The Certification that the form work and elevations are according to the design drawings, within allowable tolerances (which need to be indicated in the certification) should be provided to the SRE/CO for review and acceptance prior to concrete for the foundations being poured.

D. During progress of work, and particularly as work progresses from floor to floor, the Contractor will have line grades and plumbness of all major form work checked and certified by a registered land surveyor or registered civil engineer as meeting requirements of contract drawings. Furnish such certification to the SRE/CO before any major items of concrete work are placed. In addition, furnish to the SRE/CO certificates from a registered land surveyor or registered civil engineer that the following work is complete in every respect as required by contract drawings.

1. Lines of each building and/or addition.
2. Elevations of bottoms of footings and tops of floors of each building and/or addition.
3. Lines and elevations of sewers and of all outside distribution systems.
4. Lines of grave plot documentation.
5. Lines of elevations of all swales and interment areas.
6. Lines and elevations of roads, streets and parking lots.
7. Lines and elevations of top of pre-placed crypts.
8. Lines and elevations of grade over pre-placed crypts.
9. Northing/Easting coordinate locations of all water, sanitary, storm, gas and irrigation structures, directional fittings, control wire and lines.

E. Upon completion of the work, the Contractor will furnish the SRE/CO with reproducible drawings, in AutoCAD form, at the scale of the contract drawings, showing the finished grade on the grid developed for constructing the work, including burial monuments and fifty-foot stationing along new road centerlines. These drawings will bear the seal of the registered land surveyor or registered civil engineer.

F. Perform the surveying and layout work of this and other articles and specifications in accordance with the provisions of Article "Professional Surveying Services".

1.15 AS-BUILT DRAWINGS

A. Maintain one full-size set of as-built drawings which will be kept current during construction of the project, which will include all contract changes, modifications and clarifications.

B. All variations will be shown in the same general detail as used in the contract drawings. To ensure compliance, as-built drawings will be made available for the SRE/CO's review, as often as requested.

C. Deliver approved completed as-built drawings to the SRE/CO within 15 after the acceptance of the project by the SRE/CO.

D. Paragraphs A, B, & C will also apply to all shop drawings.

E. Produce irrigation system "As-built" drawings that show the actual locations for the pipes, bends, fittings, wiring and appurtenances. The location for the underground materials as well as the depth will be indicated, and curved pipe installations will be indicated, and bends and fittings will have swing ties showing the locations, using physical

features that will be visible in the winter, whenever possible. Swing ties will be as close to perpendicular as possible. The "As-Built" drawing for the irrigation system wiring will show the routing of the wires from controller to corresponding operational elements, and wire colors and numbers and color of spare wires will be indicated. The wiring diagram for the irrigation system will include routing of power lines to the equipment as well as the grounding equipment. The actual location of the installed elements on a scaled drawing will be provided using the enlarged design drawing background to show the actual installation and not the schematic representation of the elements. All sleeves for pipes and/or wires will be indicated with the size, type of material location and depth indicated on the "As-Built" drawings.

F. Produce an "As-Built" drawing of the crypt field installations indicating the numbering of the crypts and the burial plots, irrigation aisles, indicating the type of crypt installed in each plot (interior or perimeter) as well as any installed oversized crypts, with the placement and size of the vault indicated. The "As-Built" drawing of the crypt field as installed will be certified by a registered land surveyor or registered Professional Engineer. The certification will indicate that the installed crypts have their lids installed within their respective burial plots and that the surface of the lids is installed within +/- 1/4" of the plane established for the top of the crypts in the design drawings as specified. The location of the lids for any oversized vaults will be shown within 1/2" of the actual location. Coordinates for the location of the corners, and corresponding elevations, of any oversized vaults will be indicated or available from the electronic "As-Built" drawing files. The "As-Built" drawing for the crypt fields will also contain a written certification from the registered land surveyor or registered civil engineer that the finished grade that exists above the crypts is at the elevation of the plane for that surface established in the design drawings within an allowable construction tolerance of +/- 1-inch.

G. Produce "As-Built" drawings of all subsurface infrastructure improvements, with the location and depth of the improvements being indicated on the drawings. The drawings will have references indicated that will establish real world (State Plane) coordinates and elevations on the drawing sheets. Infrastructure improvements that are below

ground will be clearly indicated and will be located within 4-inches of their actual location. If underground infrastructure improvements are not being located on the "As-Built" drawings using GPS coordinates (location and elevation), then the "As-Built" drawings will have swing ties provided to ground surface above all infrastructure improvement locations needed to establish the route of the improvement on the ground surface immediately above the improvements, as well as the depth of the infrastructure improvement below the spot on the ground surface. All the location and depth information will be no greater than 4-inches from the actual location of the respective infrastructure improvement when excavated from the indicated location to the indicated depth. Swing-tie information will be from final project improvements, or existing improvements deemed final by the SRE/CO and each location identified will be by a minimum of two swing ties (close to 90 degrees apart).

1.16 USE OF ROADWAYS

A. Under regulations prescribed by the SRE/CO, use only established roadways, or use temporary roadways constructed by the Contractor when as authorized by the SRE/CO. Vehicles will not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation.

B. When transporting materials use only established public roads and roads on Cemetery property and, when authorized by the SRE/CO, such temporary roads which are necessary in the performance of contract work. Temporary roads not specifically indicated and detailed on the drawings will be constructed and maintained by the Contractor at the Contractor's expense including all necessary erosion and sediment control facilities. When necessary to cross new or existing curbing, sidewalks, or similar construction, the Contractor must furnish install, maintain and remove adequate protection by well-constructed bridges.

1.17 SRE/CO'S FIELD OFFICE

A. Not Applicable

1.18 TEMPORARY USE OF MECHANICAL AND ELECTRICAL EQUIPMENT

A. Use of newly installed mechanical and electrical equipment to provide heat, ventilation, plumbing, light and power will be permitted subject to compliance with the following provisions:

1. Permission to use each unit or system must be given by SRE/CO. If the equipment is not installed and maintained in accordance with the following provisions, the SRE/CO will withdraw permission for use of the equipment.
2. Electrical installations used by the equipment will be completed in accordance with the drawings and specifications to prevent damage to the equipment and the electrical systems, i.e. transformers, relays, circuit breakers, fuses, conductors, and their overload elements will be properly sized, coordinated and adjusted. Voltage supplied to each item of equipment will be verified to be correct and it will be determined that motors are not overloaded. The electrical equipment will be thoroughly cleaned before using it and again immediately before final inspection including vacuum cleaning and wiping clean interior and exterior surfaces.
3. Units will be properly lubricated, balanced, and aligned. Vibrations must be eliminated.
4. Automatic temperature control systems for preheat coils will function properly and all safety controls will function to prevent coil freeze-up damage.
5. The air filtering system used will be designed for the system when complete, and all filter elements will be replaced at completion of construction and prior to testing and balancing of system.
6. All components of heat production and distribution system, metering equipment, condensate returns, and other auxiliary facilities used in temporary service will be cleaned prior to use; maintained to prevent corrosion internally and externally during use; and cleaned, maintained and inspected prior to acceptance by the Government. Burners, pumps, feedwater heaters and auxiliary equipment must be operated as a complete system and be fully maintained by operating personnel. Burner water must be given complete and continuous chemical treatment.

B. Prior to final inspection, the equipment or parts used which show wear and tear beyond normal will be replaced with identical replacements, at no additional cost to the Government.

C. This paragraph will not reduce the requirements of the mechanical and electrical specifications sections.

1.19 TEMPORARY TOILETS

A. Provide where directed, (for use of all Contractor's workmen) ample temporary sanitary toilet accommodations with suitable sewer and water connections, or when approved by SRE/CO provide suitable dry closets where directed. Keep such places clean and free from flies, and all connections and appliances connected therewith are to be removed prior to completion of contract, and premises left perfectly clean.

1.20 AVAILABILITY AND USE OF UTILITY SERVICES

A. The Government will make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract. The amount to be paid by the Contractor for chargeable electrical services will be the prevailing rates charged to the Government. The Contractor will carefully conserve any utilities furnished without charge.

B. At Contractor's expense and in a workmanlike manner satisfactory to the SRE/CO, install and maintain all necessary temporary connections and distribution lines, and all meters required to measure the amount of electricity used for the purpose of determining charges. Before final acceptance of the work by the Government, remove all the temporary connections, distribution lines, meters, and associated paraphernalia.

C. Install meters at the Contractor's expense and furnish the Cemetery a monthly record of the Contractor's usage of electricity as hereinafter specified.

D. Heat: Furnish temporary heat necessary to prevent injury to work and materials through dampness and cold. Use of open salamanders or any temporary heating devices which may be fire hazards or may produce smoke will not be permitted. Maintain minimum temperatures as specified for various materials by their respective manufacturers as required to prevent damage due to dampness or cold.

E. Electricity (for Construction and Testing): Furnish all temporary electric services.

1. Obtain electricity by connecting to the Cemetery electrical distribution system. Meter and pay for electricity required for electric cranes and hoisting devices, electrical welding devices and any electrical heating devices providing temporary heat. Where not available the Contractor will supply power via portable generators or temporary electric service from the electric utility company at own expense.

F. Water (for Construction and Testing): Furnish temporary water service.

1. Obtain water by connecting to the functional Cemetery water distribution system, potable or irrigation, as applicable for the application being tested. When in doubt use potable water. Provide reduced pressure backflow preventer at each connection to the existing potable water system. Water, where available, will be provided at no cost to the Contractor. Pressure, flow rate and volume of water will be provided at conditions that will not disrupt the operations of the existing system, provide any facilities required to make the water source characteristics suitable for Contractor's intended use(s) without adversely impacting the existing system. The VA is not responsible for providing water to the contractor for construction and/or testing.
2. Maintain connections, pipe, fittings and fixtures and conserve water-use so none is wasted. Failure to stop leakage or other wastes, or causing unacceptable adverse impacts on the existing system, will be cause for immediate revocation (at SRE/CO's discretion) of use of water from the Cemetery's system and will require or result in the Contractor connection(s) being immediately shut off.

1.21 INSTRUCTIONS

A. Furnish Operation and Maintenance (O&M) and verbal instructions when required by the various sections of the specifications and as hereinafter specified.

B. Manuals: Maintenance and operating manuals (four copies each) for each separate piece of equipment will be delivered to the SRE/CO at the time of delivery to the job site. Manuals will be created for the various equipment functional systems, with the O&M for the individual pieces of equipment being included in the appropriate functional systems. Prepare an outline of the organization and structure of all the O&M

manuals to the SRE/CO for review and approval, prior to creation of the manuals. This will be done through the submittal process and once approved the Contractor may proceed with the creation of the O&M manuals. Manuals will be complete, well organized and easy to use, detailed guides for the maintenance and operation of equipment. They will include complete information necessary for starting, adjusting, maintaining in continuous operation for long periods of time and dismantling and reassembling of the complete units and sub-assembly components. Manuals will include copies of the approved submittals for the equipment, in an Appendix for the manual, with a Table of Contents (TOC) listing the items and where the corresponding submittal materials are included. All pages in the Appendix will be numbered and the TOC will refer to the submittal locations based upon the page numbers. The TOC for the Appendix will also refer each individual submittal item to the appropriate location in the functional diagram for the functional system for the respective O&M Manual. Manuals will include an index covering all component parts clearly cross-referenced to diagrams and illustrations. Illustrations will include "exploded" views showing and identifying each separate item. Emphasis will be placed on the use of special tools and instruments. The function of each piece of equipment, component, accessory and control will be clearly and thoroughly explained. In addition to the diagrams and illustrations (which often do not actually reflect the specific installation for the project), the Manuals will include digital photographs of the actual equipment as installed, with digital annotations added using software like Adobe Pro where pdf images (photographs) can be annotated with text, arrows, lines, etc. To achieve this, the Contractor will take photographs of the equipment as installed, before it is concealed up, for the specific purpose of creating clear annotated photographs of the installation for the O&M Manuals. All necessary precautions for the operation of the equipment and the reason for each precaution will be clearly set forth. Manuals must reference the exact model, style and size of the piece of equipment and system being furnished. Manuals referencing equipment similar to but of a different model, style, and size than that furnished will not be accepted.

C. Instructions: Provide qualified, factory-trained manufacturers' representatives to give detailed instructions to assigned Department of

Veterans Affairs personnel in the operation and complete maintenance for each piece of equipment. All such training will be at the job site. These requirements are more specifically detailed in the various technical sections. Use an integrated, progressive method of providing instructions for different items of equipment that are component parts of a complete system. All instructors for every piece of component equipment in a system will be available until instructions for all items included in the system have been completed. This is to assure proper instruction in the operation of inter-related systems. All instruction periods will be at such times as scheduled by the SRE/CO and will be considered concluded only when the SRE/CO is satisfied that the training is thorough and complete. All instruction periods where structured "training" of the use of the equipment is being provided to the Cemetery operations staff will be videotaped and made into a DVD that can be used by the Cemetery staff as a refresher for the use of the specific equipment, or for training new personnel that are not familiar with the operation of the specific equipment. The Contractor will be responsible for the creation of these "training videos" subject to the review and approval of the SRE/CO. The Department of Veterans Affairs reserves the right to request the removal of, and substitution for, any instructor who, in the opinion of the SRE/CO, does not demonstrate sufficient qualifications in accordance with requirements for instructors above.

1.22 GOVERNMENT-FURNISHED PROPERTY

A. The Government will deliver to the Contractor, the Government-furnished property shown on the drawings.

B. Equipment furnished by the Government to be installed by the Contractor will be furnished to the Contractor at the Cemetery.

C. Be prepared to receive this equipment from the Government and store or place such equipment not less than 90 days before Completion Date of project.

D. Notify SRE/CO in writing 60 days in advance of date on which Contractor will be prepared to receive equipment furnished by Government. Arrangements will then be made by the Government for delivery of equipment.

   1. Immediately upon delivery of equipment, the Contractor will arrange for a joint inspection thereof with a representative of the

Government. At such time the Contractor will acknowledge receipt of equipment described, make notations, and immediately furnish the Government representative with a written statement as to its condition or shortages.

2. The Contractor thereafter is responsible for such equipment until such time as acceptance of contract work is made by the Government.

E. Equipment furnished by the Government will be delivered in a partially assembled (knock down) condition in accordance with existing standard commercial practices, complete with all fittings, fastenings, and appliances necessary for connections to respective services installed under contract. All fittings and appliances (i.e., couplings, ells, tees, nipples, piping, conduits, cables, and the like) necessary to make the connection between the Government furnished equipment item and the utility stub-up will be furnished and installed by the contractor at no additional cost to the Government.

F. Completely assemble and install the Government furnished equipment in place ready for proper operation in accordance with specifications and drawings.

G. Furnish supervision of installation of equipment at construction site by qualified factory trained technicians regularly employed by the equipment manufacturer.

1.23 RELOCATED ITEMS

A. Disconnect, dismantle as necessary, remove and reinstall in new location, all existing equipment items indicated by symbol "R" or otherwise shown to be relocated by the Contractor.

B. Perform relocation of such equipment or items at such times and in such a manner as directed by the SRE/CO.

C. Suitably cap existing service lines, such as water, drain, gas, air, and/or electrical, whenever such lines are disconnected from equipment to be relocated. Remove abandoned lines in finished areas and cap as specified herein before under paragraph "Abandoned Lines".

D. Provide all mechanical and electrical service connections, fittings, fastenings and any other materials necessary for assembly and installation of relocated equipment; and leave such equipment in proper operating condition.

E. All service lines such as noted above for relocated equipment will be in place at point of relocation ready for use before any existing

equipment is disconnected. Make relocated existing equipment ready for operation or use immediately after reinstallation.

1.24 CONSTRUCTION SIGN

A. Not Applicable

1.25 SAFETY SIGN

A. Not Applicable

1.26 CONSTRUCTION DIGITAL IMAGES

A. Take digital photos daily work in progress that convey current status of the work. The images will be both close-up in nature as well as panoramic. Additional photos will be taken of work that will be covered by additional work, such as above ceiling, in-wall, or below grade to be backfilled. Share the photos with the VA by one or more methods identified by the SRE/CO. Additional photos may be required by the SRE/CO at any time at no additional cost to the Government.

1.27 FINAL ELEVATION DIGITAL IMAGES

A. Not Applicable

1.28 HISTORIC PRESERVATION

A. Where the Contractor or any of the Contractor's employees, prior to, or during the construction work, are advised of or discover any possible archeological, historical and/or cultural resources, the Contractor will immediately notify the SRE/CO verbally, and then with a written follow-up.

1.29 PROJECT HEALTH AND SAFETY PLAN

A. Prior to commencing any construction, submit a site-specific Project Health and Safety Plan (PHSP). At a minimum, the PHSP will cover the following topics:

1. Organizational structure (including Responsible Persons)
2. Site Characterization and Job Hazard Identification
3. Site Control and Security
4. Training
5. Medical Surveillance
6. PPE
7. Exposure Monitoring
8. Heat Stress9
9. Spill Containment
10. Decontamination
11. Emergency Response

12. Confined Spaces
13. Hosting Operations
14. Trench Safety
15. Lockout/Tagout

1.30 PROJECT SUSTAINABILITY GOALS

A. Develop and distribute copies of the work plan to each subcontractor and the SRE/CO. The overall goal for the work plan is to provide a project that meets the functional program needs and incorporates the requirements and principles of sustainability as defined by Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.

B. The project goal generally:

1. Preserve and restore the site ecosystem and biodiversity; avoid site degradation and erosion; minimize offsite environmental impact.
2. Use the minimum amount of energy, water, and materials feasible to meet the design intent.
3. Use **ENVIRONMENTALLY** preferable products and decrease toxicity level of materials used.
4. Use renewable energy and material resources.
5. Optimize operational performance (through commissioning efforts) to ensure energy efficient equipment operates as intended. Consider the durability, maintainability, and flexibility of building systems.
6. Manage construction site and storage of materials to ensure no negative impact on the indoor environmental quality of the building.
7. Reduce construction waste through reuse, recycling, and supplier take-back.

C. Sustainability is the balance of environmental, economic, and societal considerations.

1.31 CORRESPONDENCE

A. To ensure accurate record keeping the Contractor will serialize all letters and official correspondence sent to the Government. Letters will be divided into two categories, one for change proposals/requests and another for all other types of correspondence. The Contractor will keep an updated log of all correspondence sent which will document the serial number, subject of letter, date received by the Government, and the name of the Government representative who acknowledged

receipt. Letters will be delivered electronically via email, in KAHUA and in hard copy form.

1.32 VA KAHUA CPMS

A. Obtaining Access:

1. VA contractors, selected by award to perform work, are required to get access to the VA KAHUA Project Management Information System (PMIS). The KAHUA PMIS is the management and collaborative environment that the VA uses for projects within the Office of Construction & Facilities Management (CFM) and National Cemetery Administration (NCA).
2. The contractor is solely responsible for acquiring access to the VA KAHUA PMIS.
3. The Contractor will ensure all designated personnel obtain necessary credentials and complete VA-provided onboarding and training prior to initiating work.
4. Access to the system will comply with VA and Federal security protocols, including multi-factor authentication and user identity verification.
5. To gain access to the VA KAHUA PMIS the contractor must follow the licensing process as specified in Appendix A

B. Onboarding to Kahua:

1. Within ten (10) calendar days after Notice to Proceed, the Contractor will initiate the Kahua onboarding process in coordination with the VA Project Team. The onboarding process will include the following steps:
   i. User Identification and Account Request
      1. Contractor will submit a list of all project team members requiring Kahua access, including role, email address, and organization.
      2. VA PMIS Administrator will review and approve user access requests and assign appropriate permissions.
   ii. System Access and Security Compliance
      1. Each user will receive an email invitation to access Kahua through the VA’s secure single sign-on process.

2. Users must complete multi-factor authentication setup and comply with VA cybersecurity requirements before accessing the platform.

iii. Initial Configuration and Workflow Validation

1. Contractor will coordinate with the COR and VA PMIS Support Team to confirm active workflows (RFIs, Submittals, Daily Reports, etc.) are functioning correctly.
2. Contractor will upload an initial project directory, schedule of values, and project contacts within Kahua as part of system validation.

iv. Training

1. The VA will provide training and reference materials for the use of Kahua (including Quick Reference Guides and VA-specific process training).
2. The Contractor will ensure that all personnel responsible for data entry or workflow actions complete the required training prior to using the system.
3. Training completion must be documented prior to system use.

v. Confirmation of Readiness

1. Upon completion of onboarding, the Contractor will submit a "Kahua Readiness Certification" to the COR confirming that all required users are active, trained, and capable of performing required tasks in the system.

C. Requirement: KAHUA is the management and collaborative environment that VA CFM uses for all construction projects. VA requires its contractors to utilize KAHUA as part of the performance for a VA construction-related contract. There is no cost for KAHUA licenses to the contractors.

1. The Contractor will utilize Kahua for the following project management functions:

vi. Requests for Information (RFIs)

vii. Submittals

viii. Design Review

ix. Daily construction reports
x. Meeting minutes and agendas
xi. Schedule updates and milestone tracking
xii. Punch list and closeout documentation
xiii. Correspondence and transmittals
xiv. Change management (PCOs, CORs, COs)

2. The Contractor will not use external systems or email as substitutes for the required Kahua workflows unless specifically authorized in writing by the CO or COR.
3. All documentation uploaded into Kahua will become part of the official contract record.
4. Contractor will enter, update, and maintain all required information in Kahua in real time, or as otherwise specified in VA workflow requirements.
5. Delays in data entry or failure to maintain required documentation in Kahua may be considered non-compliance with contract requirements and may affect payment.
6. The Contractor will not delete or alter records within the platform except as permitted by VA administrative procedures.

D. Inquiries or to request additional services, contact the following:
Craig Alsheimer, Federal Account Manager
Computerized Facility Integrations, LLC
18000 West Nine Mile Road
Suite 700
Southfield, MI 48075
Email: calsheimer@gocfi.com
Phone: 248-557-4234 Extension 6010; 410-292-7006

E. Process:
1. Once the contractor has been notified by VA of the award and a unique contract number, the contractor can enter a request for access to KAHUA at URL https://valicensing.oncfi.com/
2. CFI will process the request for access and payment. CFI will create a USER ID and password. Security provisions required to align the contractor to the Contract Number will be entered and an email will be generated and submitted to the requestor.
3. CFI will also provide standard terms and conditions related to the transaction and use agreement.

---END---

SECTION 01 33 23
SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

1.1 SUMMARY

This specification defines the general requirements and procedures for submittals. A submittal is information submitted for VA review to establish compliance with the contract documents. Detailed submittal requirements are found in the technical sections of the contract specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective technical specifications. VA approval of a submittal does not relieve the Contractor of the responsibility for any error which may exist. The Contractor is responsible for fully complying with all contract requirements and the satisfactory construction of all work, including the need to check, confirm, and coordinate the work of all subcontractors for the project. Non-compliant material incorporated in the work will be removed and replaced at the Contractor's expense.

1.2 DEFINITIONS

A. Preconstruction Submittals: Submittals which are required prior to issuing contract notice to proceed or starting construction. For example, Certificates of insurance; Surety bonds; Site-specific safety plan; Construction progress schedule; Schedule of values; Submittal register; List of proposed subcontractors.

B. Shop Drawings: Drawings, diagrams, and schedules specifically prepared to illustrate some portion of the work. Drawings prepared by or for the Contractor to show how multiple systems and interdisciplinary work will be integrated and coordinated.

C. Product Data: Catalog cuts, illustrations, schedules, diagrams, performance charts, instructions, and brochures, which describe and illustrate size, physical appearance, and other characteristics of materials, systems, or equipment for some portion of the work. Samples of warranty language when the contract requires extended product warranties.

D. Samples: Physical examples of materials, equipment, or workmanship that illustrate functional and aesthetic characteristics of a material or product and establish standards by which the work can be judged. Color

SECTION 01 32 16
PROJECT SCHEDULE (NCA)

PART 1- GENERAL:

1.1 DESCRIPTION:

A. The schedule is a tool used to successfully manage the project. It will be used to plan the work, report progress, evaluate time extension requests, and is the basis for payment.

B. The Contractor will develop a fully cost loaded computer generated schedule demonstrating fulfillment of the entirety of the contract requirements, will keep the computer-generated schedule current in accordance with the requirements of this section and will utilize the plan for scheduling and coordinating the work, mitigating delays, and monitoring work under this contract including all activities of subcontractors, equipment vendors, and suppliers. After review and approval by VA, this schedule will be designated as the approved Baseline Schedule.

C. Conventional Critical Path Method (CPM) technique will be utilized to satisfy both time and cost applications. All schedule data and reports required under this specification section will be based upon total float, not relative or free float schedules. The approved baseline schedule becomes the official project schedule of record governing schedule management, oversight, and actions on the corresponding contract.

1.2 CONTRACTOR'S REPRESENTATIVE:

A. The Contractor will designate a representative on the site who will be responsible for the preparation, timeliness, quality and the accuracy of the project schedule, coordinate reviews, and report progress of the project with and to the Contracting Officer's representative.

B. The Contractor's representative will have direct project control and complete authority to act on behalf of the Contractor in fulfilling the requirements of this specification section and such authority will not be interrupted throughout the duration of the project.

1.3 CONTRACTOR'S CONSULTANT:

A. To fulfill all the requirements of this specification section, the Contractor will engage an independent consultant who is skilled in the time and cost application of scheduling using CPM techniques for similar sized construction projects, the cost of which will be included in the Contractor's bid proposal price. The consultant must have prepared and maintained at least 3 previous schedules of similar size and complexity to this contract using either Primavera P6 or Microsoft Project software. At the Contracting Officer’s request, the scheduler will be present in-person at monthly schedule review meetings. Any travel costs incurred will be at no additional cost to the Government. This consultant will not have any financial ties, business ties, affiliation with, or be a subsidiary company to, the Contractor. The consultant is expected to provide unbiased professional services to the contractor and to VA’s representatives in developing and maintaining the project schedule.

B. Prior to engaging a consultant, and within 10 calendar days after award of the contract, the Contractor will submit to the Contracting Officer:
   1. The name and address of the proposed consultant and Company.
   2. Sufficient information to show that the proposed consultant has the qualifications to meet the requirements specified in this specification section.
   3. A list of prior construction projects, along with selected CPM samples on current projects which the proposed consultant has performed complete project scheduling services. These samples must show complete project planning for a project of similar size and scope as covered under this contract.

C. The Contracting Officer has the right to approve or disapprove employment of the proposed consultant and will notify the Contractor of the VA decision within seven calendar days from receipt of information. In case of disapproval, the Contractor will resubmit another consultant within 10 calendar days for renewed consideration. The contractor must have their CPM Consultant approved prior to i) submitting the baseline schedule, ii) Notice to Proceed, iii) Pre-construction Conference.

1.4 PRIOR TO BASELINE SCHEDULE ACCEPTANCE

A. At the time of the Pre-Construction Conference, prior to the issuance of the project Notice to Proceed, the Contractor and the Contractor's Scheduling Consultant will arrange a separate meeting with the Contracting Officer and/or their representative to discuss the requirements of this specification.

B. With exception of bonds, insurance, and limited mobilization cost associated with preparatory work such as site trailers, staging areas, haul roads etc., the approval of the baseline schedule is a condition precedent to:

1. Processing of contractor's pay request(s) for any construction activities/items of work.
2. Review of any schedule updates.

C. Government review comments on the contractor's schedule will not relieve the contractor from compliance with requirements of this specification section and the remaining contract documents.

PART 2 - SCHEDULE CRITERIA / DATA REQUIREMENTS:

2.1 COMPUTER PRODUCED SCHEDULE DEVELOPMENT CRITERIA

A. The computer produced schedule will be prepared and maintained using either Primavera P6 or Microsoft Project software.

B. Work Breakdown Structure (WBS) - Group all activities and milestones within appropriate WBS categories including, at a minimum, the following:

a. Project Milestones:
(1) Management Milestones
(2) Project Administrative Meetings

b. Pre-Construction Phase:
(1) Submittals and Reviews
(2) Procurement

c. Construction Phase: Create multiple sub-sections in accordance with project specific categories of work including in WBS descending order as follows:
(1) General Area
(a) Specific Area of Work
1. Definable Feature of Work

d. Commissioning: Not Used

e. Project Closeout: Include activity items such as QC inspection, working off punch list items, VA final inspection, demobilization, as-built drawings, landscape establishment, training, etc.

f. Modifications: Create multiple sub-sections as the project progresses identified by modification number and title upon issuance of the SF30.

C. Work activity/event relationships will be restricted to Finish-to-Start (FS) and Start-to-Start (SS) without lag. Note: Some exception may be allowed for lag in SS relationships but must be approved by the VA's Contracting Officer on case-by-case basis prior to inclusion in the schedule.

D. Activity/event constraints not required by the contract will not be accepted unless submitted to and approved by the Contracting Officer. The contractor will make a separate written detailed request to the Contracting Officer identifying these date constraints and why they are logically necessary to secure the Contracting Officer's written approval before incorporating them into the schedule. The Contracting Officer's separate approval of the schedule will not excuse the contractor of this requirement.

E. Logic events (non-work milestones) will be permitted where necessary to reflect proper logic among work events but must have zero duration. The complete computer schedule will reflect the Contractor's approach to pursuing the entire project.

F. Intermediate Phasing milestones contained in the contract documents will be clearly shown in the schedule.

G. The Contractor's initial baseline submission will reflect the original contract scope of work.

H. Early Project Completion or "Short Schedule" – VA will not approve any baseline schedule which shows completion of the work prior to the contract completion date. There will not be any "filler" or "contingency" type of activities to fill the entire contract duration. VA has no obligation to accelerate activities to support a proposed early contract completion. However, if subsequent updates show that

early handover is feasible due to "ahead of schedule" situation, VA may accept the work earlier at no additional cost to the Government.

I. The Critical Path will be limited to:
   1. No more than 20% of the activities will be on the critical and near-critical path(s). On the baseline schedule the critical path is defined as activities with zero (0) day total float. Near-Critical path(s) is defined as activities with one (1) to twenty (20) days of total float.
   2. Multiple Critical paths will not be allowed.

J. The Contractor will show activities/events for:
   1. Contractor's time required for the preparation of submittals required by the specification, shop drawings, templates, fabrication, delivery, and similar pre-construction work.
   2. Contracting Officer's and Architect-Engineer's review and approval of material submittals, shop drawings, equipment schedules samples, template, or similar items with time duration of **no less than 20 calendar days**.
   3. Fabrication and delivery of materials that are not locally available immediately upon approval of the submittal data. These activities will be tied to the related construction activity/activities.
   4. Shutdowns or Interruption of VA utilities, delivery of Government furnished equipment (GFE), project phasing and any other specification requirements.
   5. VC/VV Equipment - All GFCI (Government Furnished, Contractor Installed) and GFGI (Government Furnished, Government Installed) equipment will be clearly shown in the schedule.
   6. Test, adjust, and balance (TAB) various systems and pieces of equipment, maintenance and operation manuals, instructions, and preventive maintenance tasks.
   7. Commissioning (Cx)Activities – Not used.
   8. Once the duration schedule is delivered to the Contractor, the Contractor will collaborate with the Commissioning Agent to integrate all commissioning activities into the fixed duration construction schedule in accordance with requirements for scheduling the project. The Baseline Schedule, as approved by the VA at the beginning, may not have all necessary Cx details, but the contractor

is required to subsequently update the commissioning activities as the more detailed **Commissioning Duration Schedule** is being developed.

K. VA inspection and acceptance activity/event with a minimum duration of five workdays at the end of each phase and immediately preceding any VA move activity/event required by the contract phasing for that phase. Schedule these activities/events so that only one phase is scheduled for completion within the same 30 consecutive calendar day period (except for those phases immediately preceding the final acceptance). Maintain this scheduling condition throughout the length of the contract unless waived by the Contracting Officer's representative in writing.

L. Work activities/events for any asbestos abatement bid item will have a trade code of ASB.

M. Bid items other than the Base Bid (ITEM 1) and Asbestos Abatement item will have trade codes corresponding to the appropriate bid item number (e.g., ITM 3, ITM 4 and other items).

1. Show not only the activities/events for actual construction work for each trade category of the project, but also trade relationships to indicate the movement of trades from one area, floor, or building, to another area, floor, or building, for at least five trades who are performing major work under this contract.
2. Break up the work such that activities/events will have:
   a. Duration no longer than **20 workdays** each, except as to non-construction activities/events (i.e., procurement of materials, delivery of equipment, concrete and asphalt curing) and any other activities/events for which the Contracting Officer may approve the showing of a longer duration.
   b. The duration for VA approval of any required submittal, shop drawing, or other submittals will not be **less than 20 workdays**. Refer to drawing CPM-1 for VA approval activities/events which will require minimum duration longer than 20 workdays. The construction time as determined by the CPM schedule from early start to late finish for any sub-phase, phase or the entire project will not exceed the contract time(s) specified or shown.

c. An activity/event will only reflect the work of one entity (subcontract or craft).
d. The activity/event once began can continue unimpeded until the activity/event is complete.

3. Describe work activities/events clearly, so the work is readily identifiable with clear scope for assessment of completion. Activities/events labeled "start," "continue," or "completion," are not specific and will not be allowed. Lead and lag time activities will not be acceptable (Refer to item 2.1 B above for some exceptions).
4. Uniquely number each activity/event ID with ALPHA-NUMERIC value in ascending order. Activities will be numbered in such a way to reflect trade discipline, phase or location of the work.

N. Show Government and other agency activities that could impact progress. These activities include, but are not limited to, approvals, acceptance, design reviews, environmental permit approvals by State and local regulators, inspections, utility tie-in, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements.

O. The first activity in the project schedule must be a start milestone titled "Notice to Proceed," which must have a “Start On” constraint date equal to the date that the NTP is acknowledged.

P. The last activity in the schedule must be a finish milestone titled "End Project” which must have a “Finish on or Before” constraint date equal to the current Contract Completion Date as stated in the NTP letter or the most current signed contract modification.

Q. Constrain the project schedule to the Contract Completion Date in such a way that if the schedule calculates an early finish, then the float calculation for "End Project" milestone reflects positive float on the longest path. If the project schedule calculates a late finish, then the "End Project" milestone float calculation reflects negative float on the longest path. The Government is under no obligation to accelerate Government activities to support a Contractor's early completion.

R. Schedule activities on a Calendar to which the activity logically belongs. Develop calendars to accommodate any contract defined work period such as a 7-day calendar for fab/deliver activities, concrete

cure times, etc. Develop the default Calendar to match the physical work plan with non-work periods identified including weekends and holidays. Develop Seasonal Calendar(s) and assign to seasonally affected activities as applicable to account for monthly weather impacts and winter weather.

S. Only two open ended activities are allowed: the first activity "NTP Acknowledged" may have no predecessor logic, and the last activity - "End Project" may have no successor logic. Predecessor open ended logic may be allowed in a time impact analyses upon the Contracting Officer's approval.

T. Actual Start and Finish dates must not automatically update with default mechanisms included in the scheduling software. Updating of the percent complete and the remaining duration of any activity must be independent functions. Disable program features that calculate one of these parameters from the other. Activity Actual Start (AS) and Actual Finish (AF) dates assigned during the updating process must match those dates provided in the Contractor Daily Reports. Failure to document the AS and AF dates in the Daily Report will result in disapproval of the Contractor's schedule.

U. If there is no separate contract line item (CLIN) for as-built drawings, cost load the "Submission and approval of as-built drawings" activity not less than $10,000 or 1 percent of the present contract value, whichever is greater, up to $200,000. Activity will be declared 100 percent complete upon the Government's approval.

W. Resource loading will include manpower by labor classification and equipment by type. Use the Resources feature of P6 to reflect the number of workers and/or pieces of equipment required each day to finish the activity within the Original Duration.

2.2 WORK ACTIVITY/EVENT COST DATA

A. Cost Loading - The Contractor will cost load all work activities/events except submittal activities. The cost loading will reflect the appropriate level of effort of the work activities/events. The cumulative amount of all cost loaded work activities/events (including alternates) will equal the total contract price. Prorate overhead, profit and general conditions on all work activities/events for the

entire project length. The contractor will generate from this information cash flow curves indicating graphically the total percentage of work activity/event dollar value scheduled to be in place on early finish, late finish. These cash flow curves will be used by the Contracting Officer to assist him in determining approval or disapproval of the cost loading. In the event of disapproval, the Contractor will revise and resubmit in accordance with Article, THE INITIAL BASELINE SCHEDULE SUBMITTAL (Item 3.1B below). Negative work activity/event cost data will not be acceptable, except on VA issued contract changes.

B. The Contractor will cost load work activities/events for all BID ITEMS. The sum of the cost loading for each bid item work activities/events will equal the value of the item in the Contractors' bid.

PART 3 - SUBMITTALS, DELIVERABLES, AND UPDATE PROCESS:

3.1 SUBMITTALS:

A. The Independent CPM Consultant Submittal: Within 10 calendar days after NTP, the Contractor will submit to the Contracting Officer for review and approval the qualifications of their proposed independent CPM consultant. The submittal information will be in accordance with PART 1 GENERAL, ARTICLE 1.3 CONTRACTOR'S CONSULTANT of this Specification.

B. THE INITIAL BASELINE SCHEDULE SUBMITTAL: Within 30 calendar days after Contracting Officer approval of the Independent CPM Consultant, the Contractor will submit the initial baseline schedule submittal package for the Contracting Officer's review and approval. This submittal will comply with all requirements of this specification section and will consist of:

2. Schedule
   a. Primavera P6 schedule file (.xer file) or Microsoft Project file.
   b. Five reports to be identified by the Contracting Officer.
3. Supporting Data
   a. The proposed number of working days per week and working hours per day.
   b. The holidays to be observed during the life of the contract (by day, month, and year). All Federal Holidays will be indicated.

c. Provide a typed, doubled spaced description, at least one page in length, of the sequencing plan and the contractor's overall approach to constructing the project.
d. Provide a cash flow curve (s-curve) along with monthly billing projections for the duration of the contract.
e. Failure of the Contractor to include this data will delay the review of the submittal until the Contracting Officer is in receipt of the missing data.

C. VA RESPONSE TO INITIAL BASELINE SCHEDULE SUBMITTAL

Within 20 calendar days after submittal of the initial baseline schedule, the Contracting Officer or their representative will do one or both of the following:

1. Notify the Contractor concerning their actions, opinions, and objections.
2. Hold a joint review meeting with the Contractor at or near the job site for joint review, correction, or adjustment of the submitted baseline schedule. Within 14 calendar days after the joint review, the Contractor will revise and resubmit the baseline schedule along with all reports and information required by paragraph 3.1.B of this specification. The revised submission will be reviewed by the Contracting Officer and, if found to be as previously agreed upon, will be approved.
3. The corresponding computer-produced schedule and the submitted supporting data, when approved, will constitute the official **Baseline Schedule** until subsequently revised in accordance with the requirements of this section.

D. SCHEDULES UPDATE SUBMITTALS:

1. The contractor will submit to the VA Senior Resident Engineer (SRE) and CPM Schedule Analyst (simultaneously), computer-produced time/cost schedules and reports generated from monthly progress updates. Schedule update submissions will include electronic file copies of up to **five different reports** (inclusive of all pages)to the Contracting Officer's representatives; a hard copy listing of all project schedule changes and reasons for the changes, and associated data, made at the update; and the resulting monthly schedule update file from either Primavera P6 or Microsoft Project.

These schedule reports must be submitted **within 7 calendar days of the monthly update meeting**, along with the signed (by the contractor and VA) Look ahead report (with % complete progress) made at the previous update meeting; and substantively support the contractor's monthly payment request. The SRE will identify the five different report formats that the contractor will provide based upon the monthly schedule updates.

2. The contractor is responsible for the correctness and timeliness of the computer-produced reports. The Contractor is also responsible for the accurate and timely submittal (within 7 calendar days as noted above) of the updated project schedule and all CPM data necessary to produce the computer reports and payment request that is specified.

E. VA RESPONSES TO COMPUTER PRODUCED SCHEDULE submittals

The VA may report errors in computer-produced reports to the Contractor's representative within ten calendar days from receipt of reports, indicating approval or disapproval. In case of disapproval, the Contractor will reprocess the computer-produced reports when requested by the Contracting Officer's representative, to correct errors which affect the payment and schedule for the project. This monthly reporting will be a formal submittal process and the next month's update will not proceed without approval.

F. FIRST UPDATE SCHEDULE SUBMITTAL:

Within 30 calendar days of VA acceptance of the project baseline schedule, the Contractor will submit the first update of the schedule. This update will contain any progress of the work the contractor wishes to receive payment for from contract Notice to Proceed. Any changes/delays will be entered at the first update after the baseline schedule has been approved. The Contractor will provide any requests for time and supporting time extension analysis for contract time because of contract changes/delays, after this update, and in accordance with Article, ADJUSTMENT OF CONTRACT COMPLETION. These changes/delays will be entered at the first update after the final project schedule has been approved.

G. PERIODIC PROGRESS AND PAYMENT SUBMITTALS:

The Contractor is entitled to a periodic (not less than monthly) progress payment upon approval of the resource loaded project schedule.

1. The contractor will submit the AIA application and certificate for payment documents G702 & G703 reflecting updated schedule activities and cost data in accordance with the provisions of referenced contract requirements.
2. Failure to meet the requirements of this specification may result in the disapproval of the preliminary, initial, or periodic schedule updates and subsequent rejection of payment requests until compliance is met. If the Contracting Officer directs schedule revisions and those revisions have not been included in subsequent Project Schedule revisions or updates, the Contracting Officer may withhold 10 percent of pay request amount from each payment period until such revisions to the project schedule have been made.

3.2 PAYMENT AND PROGRESS REPORTING – SCHEDULE UPDATES

A. Schedule Update Meeting - Monthly job site schedule update meetings will be held on dates mutually agreed to by the Contracting Officer (or Contracting Officer's representative) and the Contractor. The contractor and their CPM consultant will be required to attend all monthly update meetings. Presence of Subcontractors during update meeting is optional unless required by the Contracting Officer (or Contracting Officer's representative). The Contractor will update the project schedule and all other data required by this section will be accurately filled in and completed draft “pencil copy” prior to the monthly update meeting. The Contractor will provide this information to the Contracting Officer or the VA representative in completed form three workdays in advance of the update meeting. The contractor will use only approved previous month’s schedule to report progress (% complete) in “pencil copy” and will not change this in any shape or form. Schedule submissions containing unapproved changes will be rejected. Logic or duration changes for future incomplete activities will be entered later as agreed upon in the meeting and shown in the resulting reports. Job progress will be reviewed to verify:

1. Actual start and/or finish dates for updated/completed activities/events.

2. Remaining duration, required to complete each activity/event started, or scheduled to start, but not completed.
3. Percentage for completed and partially completed activities/events.
4. Logic and duration revisions required by this section of the specifications, particularly if the baseline logic / sequence have changed significantly, which could potentially alter or impact the critical path of the schedule. Highlight and request VA approval prior to making any logic, durations, manpower and cost loading changes.
5. Activity/event duration and percent complete will be updated independently, meaning that the Remaining Durations (RD) will be reviewed for all "in-progress" activities and entered manually based on realistic remaining work content, and will not be left to "auto-calculate" by the software.
6. Out of sequence progress – Activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence progress) are not allowed except on a rare case by case basis, subject to approval by the Contracting Officer. Propose logic corrections to eliminate out of sequence progress or justify not changing the sequencing for approval prior to submitting updated monthly schedule. Correct out of sequence progress that continues for more than two update cycles by logic revision, as approved by the Contracting Officer. Also, submit complete revised schedule when more than 5% of the remaining activities are out of sequence. Calculate multiple float paths option is not allowed.
7. Logic changes – Specifically identify and discuss all logic changes pertaining to change orders (see section item 3.2.E below), contractor proposed changes in work plan or sequence, correction to schedule logic for out-of-sequence progress etc. that have been made pursuant to contract provisions. VA will only approve logic revisions to keep the schedule valid in terms of its usefulness in calculating a realistic completion date, correcting erroneous logic ties, and accurately sequencing the work.

B. Schedule Narrative - The Contractor, in addition to the 5 schedule reports noted earlier, will submit a narrative report after the update meeting in a form agreed upon by the Contractor and the Contracting

Officer. The narrative report will be prepared by the contractor's authorized representatives (Project manager, Superintendent, or another responsible official) and not by the CPM consultant. The narrative report will include a description of major construction problem areas; current and anticipated delaying factors and their estimated impact on performance of other activities/events and completion dates; and an explanation of corrective action being taken or proposed. If the contract completion date was delayed during the update period, the narrative will identify the activities that caused the delay and state the reason for delay. This narrative will also include 1) any forward Logic Revisions; 2) any added or deleted activities; 3) any cost loading or budget changes; 4) any missed major milestones. This monthly schedule narrative will also briefly discuss the potential schedule risks / mitigation efforts, as required by the item 3.1.G above. This report is in addition to the daily reports pursuant to the provisions of Article, DAILY REPORT OF WORKERS AND MATERIALS in the GENERAL CONDITIONS.

C. Cash Flow S-curve or Schedule Variance Control (SVC) Diagram – With each schedule submission, provide a SVC diagram showing Scheduled and Actual (earned value) Project cost curve (both incremental and cumulative) based on both projected early and late activity finish dates. Also, revise the Cash Flow S-curve when the contract is modified, or as directed by the Contracting Officer.

D. After completion of the joint review and the Contracting Officer's approval of all entries, the contractor will generate an updated computer-produced calendar-dated schedule and submit to the Contracting Officer's representative with reports in accordance with the Article, COMPUTER PRODUCED SCHEDULES, specified. These reports will be submitted within 7 calendar days after the monthly update meeting to the SRE and the VA CPM Schedule analyst simultaneously via electronic media, as noted earlier.

E. Parallel Runs / Time Extension Analysis – The Contractor will provide a proposed frag net as part of every change order/supplemental agreement proposal. The frag net proposal will consist of a list of proposed activities encompassing the scope of the changed work, proposed duration for each activity, and proposed predecessor/successor for the

frag net. Upon approval of the Contracting Officer, the contractor's CPM consultant will produce a parallel run incorporating all current period contract change(s) as a batch against the **previous month's** approved monthly project schedule with no other changes made. Insertion of any Change Order or Supplemental Agreement activities into the CPM database with faulty logic ties like NTP (predecessor) and Project complete (successor) and zero (0) duration will not be accepted. The resulting electronic project schedule data file will be appropriately identified as a parallel run and submitted to the VA SRE and the CPM Analyst in accordance with the requirements listed in articles 3.2.D. This electronic submission is separate from the regular monthly project schedule reports requirements and will be submitted to the SRE within fourteen (14) calendar days of completing the regular schedule update meeting. The VA will perform a Time Impact Analysis (TIA) of all parallel run submissions. If the TIA concludes that the parallel run results in a delay to the critical path (longest path) a time extension will be included as part of a Supplemental Agreement.

F. Ownership of Project Float – Project float is the length of time between the contractor's predicted completion milestone and the contract completion date milestone. Project Float available in the schedule, at any time, will not be considered for the exclusive use of either the VA or the Contractor.

G. Out-of-Sequence Progress - Activities that have progressed before all preceding logic has been satisfied (Out-of-Sequence Progress) will be allowed only on a case-by-case basis subject to approval by the Contracting Officer. Propose logic corrections to eliminate out of sequence progress or justify not changing the sequencing for approval prior to submitting an updated project schedule. Address out of sequence progress or logic changes in the Narrative Report and in the periodic schedule update meetings.

H. Added and Deleted Activities - Do not delete activities from the project schedule or add new activities to the schedule without approval from the Contracting Officer. Activity ID and description changes are considered new activities and cannot be changed without Contracting Officer approval.

I. Original Durations - Activity Original Durations (OD) must be reasonable to perform the work item. OD changes are prohibited unless justification is provided in writing and approved by the Contracting Officer.

J. Logic Changes – Logic changes are prohibited unless justification is provided in writing and approved by the Contracting Officer.

K. Retained Logic - Schedule calculations must retain the logic between predecessors and successors ("retained logic" mode) even when the successor activity(s) starts, and the predecessor activity(s) has not finished (out-of-sequence progress). Software features that in effect sever the tie between predecessor and successor activities when the successor has started, and the predecessor logic is not satisfied ("progress override") will not be allowed.

3.3 RESPONSIBILITY FOR COMPLETION / PROJECT DELAY

A. Whenever it becomes apparent from the current monthly progress review meeting or the monthly schedule update that phasing or contract completion dates will not be met, the Contractor will provide a Recovery Plan to the Contracting Officer outlining the remedial action they will take to recover from the delay. Remedial actions can consist of some of all the following measures with a focus on critical path activities:

1. Increase construction manpower in such quantities and crafts as necessary to eliminate the backlog of work.
2. Increase the number of working hours per shift, shifts per working day, working days per week, the amount of construction equipment, or any combination of the foregoing to eliminate the backlog of work.
3. Reschedule the work in conformance with the specification requirements to recover all the delay for which the contractor is responsible.

B. Prior to proceeding with any of the above actions, the Contractor will obtain approval from the Contracting Officer for the proposed Recovery Plan. If such actions are approved, the contractor will incorporate any required changes to the schedule into the next update, at no additional cost to the Government.

3.4 CHANGES TO PROJECT SCHEDULE AND SCHEDULE UPDATES:

A. Within 30 calendar days after VA acceptance and approval of any updated computer-produced schedule, the Contractor will submit a revised schedule file, the associated requested reports, and a list of any activity/event changes including predecessors and successors for any of the following reasons:

1. Delay in completion of any activity/event or group of activities/events; that indicate an extension of the project completion by 20 working days or 10 percent of the remaining project duration, whichever is less.
2. Delays in submittals, deliveries, or work stoppage are encountered which make rescheduling of the work necessary.
3. The schedule does not represent the actual prosecution and realistic progress of the project, or when more than 5% of the remaining activities are "out of sequence" as noted earlier.
4. When there is, or has been, a substantial revision to the activity/event costs of the project schedule regardless of the cause for these revisions.

B. CPM revisions made under this paragraph which affect the previously approved computer-produced schedules for Government furnished equipment, vacating of areas occupied by VA personnel, contract phase(s) and sub phase(s), utilities furnished by the Government to the Contractor, or any other previously contracted item, must be furnished in writing to the Contracting Officer for approval.

C. Contracting Officer's approval for the revised schedule and all relevant data is contingent upon compliance with all other paragraphs of this section and any other previous agreements by the Contracting Officer or the VA representative.

D. The cost of revisions to the project schedule resulting from contract changes will be included in the proposal for changes in work and will be based on the complexity of the revision or contract change, man hours expended in analyzing the change, and the total cost of the change.

E. The cost of revisions to the project schedule not resulting from contract changes is the responsibility of the Contractor.

3.5 ADJUSTMENT OF CONTRACT COMPLETION DATE / TIME EXTENSION DUE TO CHANGES TO THE CONTRACT

A. Contract Time Extension due to Changes to Contract - The contract completion date will be adjusted only for causes specified in this contract. The contractor will submit requests for a time extension to the Contracting Officer within reasonable time frame (within 1 month of the issuance of the Change order or before signing of the bilateral Supplemental Agreement) and must provide a justification, CPM data and additional supporting evidence as the Contracting Officer may deem necessary for determination as to whether the Contractor is entitled to a time extension under the provisions of the contract. For a forward-looking analysis, frag nets must be inserted into the most recent schedule update and must have logical predecessors and successors. For a backward-looking analysis, window analysis will be used with the full benefit of hindsight. All analyses will follow guidelines published in AACE International Recommended Practice 29R-03 or 52R-06. The schedule must clearly display that the Contractor has used, in full, all the float time available for the work involved in this request. The Contracting Officer's determination as to the total number of days of contract extension will be based upon the results of analyses following the requirements of this section.

B. Actual delays in activities/events which, according to the computer-produced calendar-dated schedule, do not affect the original or extended contract completion dates shown by the critical path in the schedule, will not be the basis for a change to the contract completion date. Positive float can be used by the Government with no overhead payments to the Contractor. The Contracting Officer will, within a reasonable time after receipt of such justification and supporting evidence, review the facts and advise the Contractor in writing of the Contracting Officer's decision. The burden of proof to request the time extension is the sole responsibility of the contractor, and the contractor is required to revise the analysis or provide further documentation when requested by the Contracting Officer.

C. The Contractor will submit each request for a change in the contract completion date to the Contracting Officer. The Contractor will include, as a part of each change order proposal, a sequence of activities showing all CPM logic revisions (Fragnets), duration (in

workdays) changes, and cost changes, manpower loading for work in question and its relationship to other activities on the approved project schedule (as specified above in item 3.2.E – Parallel Run /Time Impact Analysis).

D. All delays due to non-work activities/events such as RFI's, WEATHER, STRIKES, and similar non-work activities/events will be analyzed on a month-by-month basis.

1. Delay attributed to unusually severe weather must be supported by climatological data covering the period in question, as compared to the same period for the ten preceding years. A ten-year average will be established using data from the National Oceanic and Atmospheric Administration. When the weather condition in question exceeds the ten-year average in intensity or frequency, the excess experienced is considered "unusually severe." Weather impacts will be reviewed monthly along with the schedule submission, and because contract time is based upon calendar days, the days of the week are immaterial. Weather will be considered to have impacted progress if the critical path activity was delayed for at least 50% of any given day. Overhead payments will not be made for time extensions granted for weather impacts.
2. For RFI's, strikes and similar non-work activities/events, the contractor will submit to the SRE a report for the time the contract was delayed. This report will give the dates the delay began and ended, the cause of the delay, the part or parts of work affected, and the number of calendar days the delay affected the contract completion date. Overhead payments will not be made for time extensions granted for acts of God or of the public enemy, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, or failure of a subcontractor to perform.

- - - E N D - - -

samples from the manufacturer's standard line (or custom color samples if specified) to be used in selecting or approving colors for the project. Field samples and mock-ups constructed to establish standards by which the ensuing work can be judged.

E. Design Data: Calculations, mix designs, analyses, or other data pertaining to a part of work.

F. Test Reports: Report which includes findings of a test required to be performed by the Contractor on an actual portion of the work. Report which includes finding of a test made at the job site or on sample taken from the job site, on portion of work during or after installation.

G. Certificates: Document required of Contractor, or of a manufacturer, supplier, installer, or subcontractor through Contractor. The purpose is to document procedures, acceptability of methods, or personnel qualifications for a portion of the work.

H. Manufacturer's Instructions: Pre-printed material describing installation of a product, system, or material, including special notices and (MSDS) concerning impedances, hazards, and safety precautions.

I. Manufacturer's Field Reports: Documentation of the testing and verification actions taken by manufacturer's representative at the job site on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must indicate whether the material, product, or system has passed or failed the test.

J. Operation and Maintenance Data: Manufacturer data that is required to operate, maintain, troubleshoot, and repair equipment, including manufacturer's help, parts list, and product line documentation. This data will be incorporated in an operations and maintenance manual.

K. Closeout Submittals: Documentation necessary to properly close out a construction contract. For example, Record Drawings and as-built drawings. Also, submittal requirements necessary to properly close out a phase of construction on a multi-phase contract.

1.3 SUBMITTAL REGISTER

The submittal register will list items of equipment and materials for which submittals are required by the specifications. The contractor can use/edit/modify the sample or submit their own register. This list may not be all inclusive and additional submittals may be required by the

specifications. The Contractor is not relieved from supplying submittals required by the contract documents, but which have been omitted from the submittal register. The submittal register will serve as a scheduling document for submittals and will be used to control submittal actions throughout the contract period. The VA will provide the initial submittal register in electronic format. Thereafter, the Contractor will track all submittals by maintaining a complete list, including completion of all data columns, including dates on which submittals are received and returned by the VA. The Contractor will update the submittal register as submittal actions occur and maintain the submittal register at the project site until final acceptance of all work by Contracting Officer. The Contractor will meet monthly with the designated REO team member to review and get approval of the updated submittal register. Submit formal monthly updates to the submittal register in electronic format. Each monthly update will document actual submission and approval dates for each submittal.

1.4 SUBMITTAL SCHEDULING

Submittals are to be scheduled, submitted, reviewed, and approved prior to the acquisition of the material or equipment. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. Scheduled submittals will be included and shown in the overall project schedule. Allow time for potential resubmittal. No delay costs or time extensions will be allowed for time lost in late submittals or resubmittals.

1.5 SUBMITTAL PREPARATION

Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Collect required data for each specific material, product, unit of work, or system into a single submittal. Prominently mark choices, options, and portions applicable to the submittal. Partial submittals will not be accepted for expedition of construction effort. Submittal will be returned without review if incomplete. If available product data is incomplete, provide Contractor-prepared documentation to supplement product data and satisfy submittal requirements. Provide a transmittal form for each submittal with the following information:

- Project title and location.
- Construction contract number.
- Date of the drawings and revisions.

- Name, address, and telephone number of subcontractors, supplier, manufacturer, and any other subcontractor associated with the submittal.
- List paragraph number of the specification section and sheet number of the contract drawings by which the submittal is required.
- When a resubmission, add alphabetic suffix on submittal description. For example, submittal 18 would become 18A, to indicate resubmission.
- Product identification and location in project.

The Contractor is responsible for reviewing and certifying that all submittals are in compliance with contract requirements before submitting for VA review. Proposed deviations from the contract requirements are to be clearly identified. Failure to point out deviations will result in the VA requiring removal and replacement of such work at the Contractor's expense. Stamp, sign, and date each submittal transmittal form indicating action taken. Stamp used by the Contractor on the submittal transmittal form to certify that the submittal meets contract requirements is to be similar to the following:

CONTRACTOR

(Firm Name)

_____Approved

_____Approved with corrections as noted on submittal data and/or attached sheets(s)

SIGNATURE: _____

TITLE: _____

DATE: _____

1.6 SUBMITTAL FORMAT AND TRANSMISSION

Provide submittals in electronic format, except for material samples. Use PDF as the electronic format, unless otherwise specified or directed by the Contracting Officer. Compile the electronic submittal file as a single, complete document. Name the electronic submittal file specifically according to its contents. Electronic files must be of sufficient quality that all information is legible. Generate PDF files from original documents so that the text included in the PDF file is both searchable and can be copied. If documents are scanned, Optical Character Resolution (OCR) routines are required. E-mail electronic submittal documents smaller than 5MB in size to e-mail addresses as directed by the Contracting Officer. Provide electronic documents over 5MB through an electronic FTP file sharing system. Confirm that the electronic FTP file sharing system can be accessed from the VA computer network. The Contractor is responsible for setting up, providing, and maintaining the electronic FTP file sharing system for the construction contract period of performance. Provide hard copies of submittals when requested by the Contracting Officer.

1.7 SAMPLES

Submit two sets of physical samples showing range of variation, for each required item. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified. When color, texture, or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison. Before submitting samples, the Contractor is to ensure that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved. The VA reserves the right to disapprove any material or equipment which previously has proven unsatisfactory in service.

1.8 OPERATION AND MAINTENANCE DATA

Submit data specified for a given item within 30 calendar days after the item is delivered to the contract site. In the event the Contractor fails to deliver O&M Data within the time limits specified, the Contracting Officer may withhold from progress payments 50 percent of the price of

the item with which such O&M Data are applicable.

1.9 VA REVIEW OF SUBMITTALS AND Requests for Information (RFI)

The VA will review all submittals for compliance with the technical requirements of the contract documents. The Architect-Engineer for this project will assist the VA in reviewing all submittals and determining contractual compliance. Review will be only for conformance with the applicable codes, standards and contract requirements. Period of review for submittals begins when the VA COR receives submittal from the Contractor. Period of review for each resubmittal is the same as for initial submittal. VA review period is 15 working days for submittals. VA review period is 10 working days for RFIs. The VA will return submittals to the Contractor with the following notations:

- "Approved": authorizes the Contractor to proceed with the work covered.
- "Approved as noted": authorizes the Contractor to proceed with the work covered provided the Contractor incorporates the noted comments and makes the noted corrections.
- "Disapproved, revise and resubmit": indicates noncompliance with the contract requirements or that submittal is incomplete. Resubmit with appropriate changes and corrections. No work will proceed for this item until resubmittal is approved.
- "Not reviewed": indicates submittal does not have evidence of being reviewed and approved by Contractor or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals after taking appropriate action.

1.10 APPROVED SUBMITTALS

The VA approval of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing, and other information are satisfactory. VA approval of a submittal does not relieve the Contractor of the responsibility for any error which may exist. The Contractor is responsible for fully complying with all contract requirements and the satisfactory construction of all work, including the need to check, confirm, and coordinate the work of all subcontractors for the project. Non-compliant material incorporated in the work will be removed and replaced at the Contractor’s expense. After submittals have been approved, no resubmittal for the purpose of

substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary. Retain a copy of all approved submittals at project site, including approved samples.

1.11 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

- - - E N D - - -

SECTION 01 35 26
SAFETY REQUIREMENTS

1.1 APPLICABLE PUBLICATIONS:

A. Latest publications listed below form part of this Article to extent referenced. Publications are referenced in text by basic designations only.

B. American Society of Safety Professionals (ASSP):

A10.1-2011.....Pre-Project & Pre-Task Safety and Health Planning

A10.34-2012.....Protection of the Public on or Adjacent to Construction Sites

A10.38-2013.....Basic Elements of an Employer's Program to Provide a Safe and Healthful Work Environment American National Standard Construction and Demolition Operations

Z359.0-2012.....Definitions and Nomenclature Used for Fall Protection and Fall Arrest

Z359.1-2016.....The Fall Protection Code

C. American Society for Testing and Materials (ASTM):

E84-2013.....Surface Burning Characteristics of Building Materials

D. The Facilities Guidelines Institute (FGI):

FGI Guidelines-2010Guidelines for Design and Construction of Healthcare Facilities

E. National Fire Protection Association (NFPA):

10-2013.....Standard for Portable Fire Extinguishers

30-2012.....Flammable and Combustible Liquids Code

51B-2014.....Standard for Fire Prevention During Welding, Cutting and Other Hot Work

70-2014.....National Electrical Code

70B-2013.....Recommended Practice for Electrical Equipment Maintenance

70E-2015 .....Standard for Electrical Safety in the Workplace

99-2012.....Health Care Facilities Code

241-2013.....Standard for Safeguarding Construction, Alteration, and Demolition Operations

F. The Joint Commission (TJC)

TJC Manual .....Comprehensive Accreditation and Certification Manual

G. U.S. Nuclear Regulatory Commission

10 CFR 20 .....Standards for Protection Against Radiation

H. U.S. Occupational Safety and Health Administration (OSHA):

29 CFR 1904 .....Reporting and Recording Injuries & Illnesses

29 CFR 1910 .....Safety and Health Regulations for General Industry

29 CFR 1926 .....Safety and Health Regulations for Construction Industry

CPL 2-0.124.....Multi-Employer Citation Policy

I. VHA Directive 2005-007

J. US Army Corps of Engineers Safety and Health Requirements Publication No. EM 385-1-1, 2014 edition

1.2 DEFINITIONS:

A. Critical Lift. A lift with the hoisted load exceeding 75% of the crane’s maximum capacity; lifts made out of the view of the operator (blind picks); lifts involving two or more cranes; personnel being hoisted; and special hazards such as lifts over occupied facilities, loads lifted close to power-lines, and lifts in high winds or where other adverse environmental conditions exist; and any lift which the crane operator believes is critical.

B. OSHA "Competent Person" (CP). One who is capable of identifying existing and predictable hazards in the surroundings and working conditions which are unsanitary, hazardous or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them (see 29 CFR 1926.32(f)).

C. Competent Person, Confined Space
The CP, Confined Space, is a person meeting the competent person requirements as defined EM 385-1-1 Appendix Q, with thorough knowledge of OSHA's Confined Space Standard, 29 CFR 1910.146, and designated in writing to be responsible for the immediate supervision, implementation and monitoring of the confined space program, who through training, knowledge and experience in confined space entry is capable of identifying, evaluating and addressing existing and potential confined space hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

D. Competent Person, Cranes and Rigging.
The CP, Cranes and Rigging, as defined in EM 385-1-1 Appendix Q, is a person meeting the competent person, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the Crane and Rigging Program, who through training, knowledge and experience in crane and rigging is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures regarding such hazards.

E. Competent Person, Excavation/Trenching.
A CP, Excavation/Trenching, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and 29 CFR 1926, who has been designated in writing to be responsible for the immediate supervision, implementation and monitoring of the excavation/trenching program, who through training, knowledge and experience in excavation/trenching is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

F. Competent Person, Fall Protection

The CP, Fall Protection, is a person meeting the competent person requirements as defined in EM 385-1-1 Appendix Q and in accordance with ASSE/SAFE Z359.0, who has been designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the fall protection program, who through training, knowledge and experience in fall protection and rescue systems and equipment, is capable of identifying, evaluating and addressing existing and potential fall hazards and, who has the authority to take prompt corrective measures with regard to such hazards.

G. Competent Person, Scaffolding

The CP, Scaffolding is a person meeting the competent person requirements in EM 385-1-1 Appendix Q and designated in writing by the employer to be responsible for immediate supervising, implementing and monitoring of the scaffolding program. The CP for Scaffolding has enough training, knowledge and experience in scaffolding to correctly identify, evaluate and address existing and potential hazards and has the authority to take prompt corrective measures regarding these hazards. CP qualifications must be documented and include experience on the specific scaffolding systems/types being used, assessment of the base material that the scaffold will be erected upon, load calculations for materials and personnel, and erection and dismantling. The CP for scaffolding must have a documented, minimum of 8-hours of scaffold training to include training on the specific type of scaffold being used (e.g. mast-climbing, adjustable, tubular frame), in accordance with EM 385-1-1 Section 22.B.02.

H. Competent Person (CP) Trainer

A competent person trainer as defined in EM 385-1-1 Appendix Q, who is qualified in the material presented, and who possesses a working knowledge of applicable technical regulations, standards, equipment and systems related to the subject matter on which they are training Competent Persons. A competent person trainer must be familiar with the typical hazards and the equipment used in the industry they are instructing. The training provided by the competent person trainer must be appropriate to that specific industry. The competent person

trainer must evaluate the knowledge and skills of the competent persons as part of the training process.

I. High Risk Activities
High Risk Activities are activities that involve work at heights, crane and rigging, excavations and trenching, scaffolding, electrical work, and confined space entry.

J. "Qualified Person" means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

K. Qualified Person, Fall Protection (QP for FP)
A QP for FP is a person meeting the requirements of EM 385-1-1 Appendix Q, and ASSE/SAFE Z359.0, with a recognized degree or professional certificate and with extensive knowledge, training and experience in the fall protection and rescue field who is capable of designing, analyzing, and evaluating and specifying fall protection and rescue systems.

L. USACE Property and Equipment
Interpret "USACE" property and equipment specified in USACE EM 385-1-1 as Government property and equipment.

M. High Visibility Accident. Any mishap which may generate publicity or high visibility.

N. Mishap: Mishap in this specification is defined according to the EM 385-1-1. A mishap is any unplanned, undesired event that occurs during the course of work being performed. This includes accidents, incidents, and near misses.

O. Mishap Criticality Categories

All mishaps that occur incidentally to an activity, project, or facility for which this specification is applicable will be reported immediately and investigated accordingly, with a formal report delivered to VA CFM within 24 hours of the reported mishap.

P. No impact – near miss incidents that should be reported and investigated;

Q. Minor incident/impact – incidents that require first aid or result in minor equipment damage (less than $5000). These incidents must be reported and investigated.

R. Moderate incident/impact – Any work-related injury or illness that results in:

a. Days away from work (any time lost after day of injury/illness onset);

b. Restricted work;

c. Transfer to another job;

d. Medical treatment beyond first aid;

e. Loss of consciousness;

f. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (5) above or,

g. any incident that leads to major equipment damage (greater than $5000).

These incidents must be investigated and are required to be reported to the VA;

S. Major incident/impact – Any mishap that leads to fatalities, hospitalizations, amputations, and losses of an eye as a result of contractors' activities. Or any incident which leads to major property damage (greater than $20,000) and/or may generate publicity or high visibility. These incidents must be investigated and are required to be reported to the VA as soon as practical, but not later than 2 hours after the incident.

T. Load Handling Equipment (LHE)
LHE is a term used to describe cranes, hoists and all other hoisting equipment (hoisting equipment means equipment, including crane, derricks, hoists and power operated equipment used with rigging to raise, lower or horizontally move a load).

U. Medical Treatment. Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by physician or registered personnel.

1.3 SUBMITTAL REQUIRMENTS:

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are submitted for information only.

A. Preconstruction Submittals

Accident Prevention Plan (APP); G

B. Reports

a. Monthly Contractor Health Safety and Environmental (HS&E) Performance Report

b. Notifications and Reports

c. Mishap Reports; G

d. LHE Inspection Reports

C. Work Plans

a. Standard Lift Plan; G

b. Critical Lift Plan; G

c. Activity Hazard Analysis (AHA)

d. Confined Space Entry Permit

e. Hot Work Permit

f. Radiography Operation Planning Work Sheet; G

g. Portable Gauge Operations Planning Worksheet; G

D. Certificates

a. Contractor Safety Self-Evaluation Checklist

b. Crane Operators/Riggers Certifications G

c. Certificate of Compliance

d. Mobile Cranes Inspection Certificate

e. License Certificates

f. Machinery & Mechanized Equipment Certification Form

1.4 REGULATORY REQUIREMENTS:

A. In addition to the detailed requirements included in the provisions of this contract, comply with the most recent edition of USACE EM 385-1-1, comply with 29 CFR 1926, comply with 29 CFR 1910 as incorporated by reference within 29 CFR 1926, comply with ASSP A10.34, and all applicable federal, state, and local laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern except with specific approval and acceptance by the Resident Engineer or Contracting Officer or Administrative Contracting Officer.

1.5 ACCIDENT PREVENTION PLAN (APP):

A. The APP (aka Construction Safety & Health Plan) will interface with the Contractor's overall safety and health program. Include any portions of the Contractor's overall safety and health program referenced in the APP in the applicable APP element and ensure it is site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all worksite safety and health of each subcontractor(s). Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that Mishap prevention responsibilities are being carried out.

B. The APP will be prepared as follows:

1. Written in English by a qualified person who is employed by the Prime Contractor articulating the specific work and hazards pertaining to the contract (model language can be found in ASSP A10.33). The Plan will adhere to the safety requirements found within these safety specifications and the United States Army Corps

of Engineers – Safety and Health Requirements Manual - EM 385-1-1-2014.

2. Address both the Prime Contractor's and the subcontractors' work operations.

3. State measures to be taken to control hazards associated with materials, services, or equipment provided by suppliers.

4. Address all the elements/sub-elements and in order as follows:

   a. **SIGNATURE SHEET.** Title, signature, and phone number of the following:

      1) Plan preparer (Qualified Person such as corporate safety staff person or contracted Certified Safety Professional with construction safety experience);

      2) Plan approver (company/corporate officers authorized to obligate the company);

      3) Plan concurrence (e.g., Chief of Operations, Corporate Chief of Safety, Corporate Industrial Hygienist, project manager or superintendent, project safety professional). Provide concurrence of other applicable corporate and project personnel (Contractor).

   b. **BACKGROUND INFORMATION.** List the following:

      1) Contractor;

      2) Contract number;

      3) Project name;

      4) Brief project description, description of work to be performed, and location; phases of work anticipated (these will require an AHA).

   c. **STATEMENT OF SAFETY AND HEALTH POLICY.** Provide a copy of current corporate/company Safety and Health Policy Statement, detailing commitment to providing a safe and healthful workplace for all employees. The Contractor's written safety program goals, objectives, and accident experience goals for this contract

should be provided. The Statement of Safety and Health Policy must be signed by a company executive.

d. **RESPONSIBILITIES AND LINES OF AUTHORITIES**. Provide the following:

1) A statement of the employer's ultimate responsibility for the implementation of his Safety and Occupational Health program;

2) Identification and accountability of personnel responsible for safety at both corporate and project level. Contracts specifically requiring safety or industrial hygiene personnel will include a copy of their resumes.

3) The names of Competent and/or Qualified Person(s) and proof of competency/qualification to meet specific OSHA or EM 385-1-1 Competent/Qualified Person(s) requirements must be attached.;

4) Requirements that no work will be performed unless a designated competent person is present on the job site;

5) Requirements for pre-task Activity Hazard Analysis (AHAs);

6) Lines of authority;

7) Policies and procedures regarding noncompliance with safety requirements (to include disciplinary actions for violation of safety requirements) should be identified;

e. **SUBCONTRACTORS AND SUPPLIERS.** If applicable, provide procedures for coordinating Safety and Occupational Health (SOH) activities with other employers on the job site:

1) Identification of subcontractors and suppliers (if known);

2) Safety responsibilities of subcontractors and suppliers.

f. **TRAINING.**

1) Site-specific SOH orientation training at the time of initial hire or assignment to the project for every employee before working on the project site is required.

2) Mandatory training and certifications that are applicable to this project (e.g., explosive actuated tools, crane operator, rigger, crane signal person, fall protection, electrical

lockout/NFPA 70E, machine/equipment lockout, confined space, etc.…) and any requirements for periodic retraining/recertification are required.

3) Procedures for ongoing safety and health training for supervisors and employees will be established to address changes in site hazards/conditions.

4) OSHA 10-hour training is required for all workers on site and the OSHA 30-hour or EM 385-1-1 training is required for Trade Competent Persons (CPs)

g. **SAFETY AND HEALTH INSPECTIONS.**

1) Specific assignment of responsibilities for a minimum daily job site safety and health inspection during periods of work activity: Who will conduct (e.g., "Site Safety and Health CP"), proof of inspector's training/qualifications, when inspections will be conducted, procedures for documentation, deficiency tracking system, and follow-up procedures.

2) Any external inspections/certifications that may be required (e.g., contracted CSP or CSHT)

h. **MISHAP INVESTIGATION & REPORTING.** The Contractor will conduct mishap investigations of all mishaps that occur onsite. The APP will include mishap investigation procedure and identify person(s) responsible to provide the following to the Resident Engineer, Contracting Officer or Administrative Contracting Officer:

1) Monthly HS&E Performance Report;

2) Mishap investigation reports;

3) Project site injury and illness logs.

All mishaps that occur incidentally to an activity, project, or facility for which this specification is applicable will be reported immediately and investigated accordingly, with a formal report delivered to VA CFM within 24 hours of the reported mishap.

i. **PLANS (PROGRAMS, PROCEDURES) REQUIRED.** Based on a risk assessment of contracted activities and on mandatory OSHA and/or EM 385-1-1 compliance programs, the Contractor will address all applicable occupational, patient, and public safety risks in site-specific compliance and accident prevention plans. These Plans will include but are not be limited to procedures for addressing the risks associates with the following:

1) Emergency response;

2) Contingency for severe weather;

3) Fire Prevention;

4) Medical Support;

5) Posting of emergency telephone numbers;

6) Prevention of alcohol and drug abuse;

7) Site sanitation (housekeeping, drinking water, toilets);

8) Night operations and lighting;

9) Hazard communication program;

10) Welding/Cutting "Hot" work;

11) Electrical Safe Work Practices (Electrical LOTO/NFPA 70E);

12) General Electrical Safety;

13) Hazardous energy control (LOTO);

14) Site-Specific Fall Protection & Prevention;

15) Excavation/trenching;

16) Asbestos abatement;

17) Lead abatement;

18) Crane Critical lift;

19) Respiratory protection;

20) Health hazard control program;

21) Radiation Safety Program;

22) Abrasive blasting;

23) Heat/Cold Stress Monitoring;

24) Crystalline Silica Monitoring (Assessment);

25) Demolition plan (to include engineering survey);

26) Formwork and shoring erection and removal;

27) Pre-Cast Concrete;

28) Public (Mandatory compliance with ANSI/ASSP A10.34-2012).

C. Submit the APP to the Resident Engineer or Contracting Officer or Administrative Contracting Officer for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.

D. Once accepted by the **Resident Engineer or Contracting Officer Representative**, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Contracting Officer or Administrative Contracting Officer until the matter has been rectified.

E. Once work begins, changes to the accepted APP will be made with the knowledge and concurrence of the Resident Engineer, Contracting Officer or Administrative Contracting Officer. Should any severe hazard exposure, i.e. imminent danger, become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Resident Engineering Office and Contracting Officer within 2 hours of discovery. Eliminate/remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions to safeguard onsite personnel, visitors, the public and the environment.

1.6 ACTIVITY HAZARD ANALYSES (AHAs):

A. AHAs are also known as Job Hazard Analyses, Job Safety Analyses, and Activity Safety Analyses. Before beginning each work activity involving a type of work presenting hazards not experienced in previous

project operations or where a new work crew or sub-contractor is to perform the work, the Contractor(s) performing that work activity will prepare an AHA (Example electronic AHA forms can be found on the US Army Corps of Engineers web site)

B. AHAs will define the activities being performed and identify the work sequences, the specific anticipated hazards, site conditions, equipment, materials, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk.

C. Work will not begin until the AHA for the work activity has been accepted by the Contracting Officer or Administrative Contracting Officer and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.

1. The names of the Competent/Qualified Person(s) required for a particular activity (for example, excavations, scaffolding, fall protection, other activities as specified by OSHA, EM 385-1-1, or other State and Local agencies) will be identified and included in the AHA. Certification of their competency/qualification will be submitted to the Government Designated Authority (GDA) for acceptance prior to the start of that work activity.

2. The AHA will be reviewed and modified as necessary to address changing site conditions, operations, or change of competent/qualified person(s).

a. If more than one Competent/Qualified Person is used on the AHA activity, a list of names will be submitted as an attachment to the AHA. Those listed must be Competent/Qualified for the type of work involved in the AHA and familiar with current site safety issues.

b. If a new Competent/Qualified Person (not on the original list) is added, the list will be updated (an administrative action not requiring an updated AHA). The new person will acknowledge in writing that he or she has reviewed the AHA and is familiar with current site safety issues.

3. Submit AHAs to the Resident Engineer, Contracting Officer or Administrative Contracting Officer for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for review at least 15 calendar days prior to the start of each phase. Subsequent AHAs as will be formatted as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.

4. The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.

5. Develop the activity hazard analyses using the project schedule as the basis for the activities performed. All activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier, or subcontractor and provided to the prime contractor for review and approval and then submitted to the, Contracting Officer Representative or Government Designated Authority for review for compliance.

1.7 PRECONSTRUCTION CONFERENCE:

A. Contractor representatives who have a responsibility or significant role in implementation of the accident prevention program, as required by 29 CFR 1926.20(b)(1), on the project will attend the pre-construction conference to gain a mutual understanding of its implementation. This includes the project superintendent, subcontractor superintendents, and any other assigned safety and health professionals.

B. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Administrative Contracting Officer as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, review, and acceptance of AHAs to preclude project delays.

1.8 SAFETY MEETINGS:

Conduct safety meetings to review past activities, plan for new or changed operations, review pertinent aspects of appropriate AHA (by trade), establish safe working procedures for anticipated hazards, and provide pertinent SOH training and motivation. Conduct meetings at least once a month for all supervisors on the project location. The SSHO, supervisors, foremen, or CDSOs must conduct meetings at least once a week for the trade workers. Document meeting minutes to include the date, persons in attendance, subjects discussed, and names of individual(s) who conducted the meeting. Maintain documentation on-site and furnish copies to the Contracting Officer on request. Notify the Contracting Officer of all scheduled meetings 7 calendar days in advance.

1.9 "SITE SAFETY AND HEALTH OFFICER" (SSHO) and "COMPETENT PERSON" (CP):

A. The Prime Contractor will provide a minimum of one SSHO at the project site, for each shift that holds a current OSHA 30 training completed within the last two years. The SSHO may hold other duties. The SSHO will ensure that the requirements of this specification, 29 CFR 1926.16, and EM385-1-1 are met. The SSHO must be at the work site at all times during construction activities to implement and administer the Contractor's safety program and government-accepted Accident Prevention Plan. If the SSHO is off-site for a period longer than 24 hours, a qualified Alternate Safety Officer will be provided and will fulfill the same roles and responsibilities as the primary SSHO. The Alternate Safety Officer will have the required training, experience, and qualifications in accordance with EM 385-1-1 Section 01.A.17, and all associated sub-paragraphs. Each subcontractor will designate a minimum of one CP in compliance with 29 CFR 1926.20 (b)(2) that will be identified as a CP to administer their individual safety programs.

B. Further, all specialized Competent Persons for the work crews will be supplied by the respective contractor as required by 29 CFR 1926 (i.e. Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, and Trenches/Excavations).

C. These Competent Persons can have collateral duties as the subcontractor's superintendent and/or work crew lead persons as well as fill more than one specialized CP role (i.e. Asbestos, Electrical,

Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations). However, the SSHO has be a separate qualified individual from the Prime Contractor's Superintendent and/or Quality Control Manager with duties only as the SSHO

D. The SSHO or an equally-qualified Designated Representative/alternate will maintain a presence on the site during construction operations. CPs will maintain presence during their construction activities in accordance with above mentioned clause. A listing of the designated SSHO and all known CPs will be submitted prior to the start of work as part of the APP with the training documentation and/or AHA as listed in Section 1.8 below.

E. The repeated presence of uncontrolled hazards during a contractor's work operations will result in the designated CP as being deemed incompetent and result in the required removal of the employee.

1.10 TRAINING:

A. The designated Prime Contractor SSHO must meet the requirements as stated in paragraph 1.9 above.

B. All designated CPs will have completed the OSHA 30-hour Construction Safety course and/or EM 385-1-1 training within the past 5 years.

C. In addition to the OSHA 30 Hour Construction Safety Course and/or EM 385-1-1 training, all CPs with high hazard work operations such as operations involving asbestos, electrical, cranes, demolition, work at heights/fall protection, fire safety/life safety, ladder, rigging, scaffolds, and trenches/excavations will have a specialized formal course in the hazard recognition & control associated with those high hazard work operations. Documented "repeat" deficiencies in the execution of safety requirements will require retaking the requisite formal course.

F. Submit training records associated with the above training requirements to the Contracting Officer or Administrative Contracting Officer for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES 15 calendar

days prior to the date of the preconstruction conference for acceptance.

G. Prior to any worker for the contractor or subcontractors beginning work, they will undergo a safety briefing provided by the SSHO or his/her designated representative. As a minimum, this briefing will include information on the site-specific hazards, construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, emergency procedures, accident reporting etc... Documentation will be provided to the COR that individuals have undergone contractor's safety briefing.

H. Ongoing safety training will be accomplished in the form of weekly documented safety meeting.

1.11 INSPECTIONS:

A. The SSHO will conduct frequent and regular safety inspections (daily) of the site and each of the subcontractors CPs will conduct frequent and regular safety inspections (daily) of their work operations as required by 29 CFR 1926.20(b)(2). Each week, the SSHO will conduct a formal documented inspection with a written report of the entire construction areas with the subcontractors' "Trade Safety and Health CPs" present in their work areas. Coordinate with, and report findings and corrective actions weekly to Contracting Officer or Administrative Contracting Officer.

B. A Certified Safety Professional (CSP) with specialized knowledge in construction safety or a certified Construction Safety and Health Technician (CSHT) will randomly conduct a monthly site safety inspection. The CSP or CSHT can be a corporate safety professional or independently contracted. The CSP or CSHT will provide their certificate number on the required report for verification as necessary.

1. Results of the inspection will be documented with tracking of the identified hazards to abatement.

2. The Contracting Officer or Administrative Contracting Officer will be notified immediately prior to start of the inspection and invited to accompany the inspection.

3. Identified hazard and controls will be discussed to come to a mutual understanding to ensure abatement and prevent future reoccurrence.

4. A report of the inspection findings with status of abatement will be provided to the Contracting Officer Representative or Government Designated Authority within one week of the onsite inspection.

1.12 MISHAPS, OSHA 300 LOGS, AND MAN-HOURS:

A. The prime contractor will establish and maintain a mishap reporting, recordkeeping, and analysis system to track and analyze all injuries and illnesses, high visibility incidents, and accidental property damage (both Government and Contractor) that occur on site. Notify the Contracting Officer or Administrative Contracting Officer as soon as practical, but no more than four hours after any mishap meeting the definition of a Moderate or Major incident, High Visibility Incidents, or any weight handling and hoisting equipment mishap. Within notification include contractor name; contract title; type of contract; name of activity, installation or location where mishap occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of mishap (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Contracting Officer Representative or Government Designated Authority determine whether a government investigation will be conducted.

B. Conduct a mishap investigation for all Minor, Moderate and Major incidents as defined in paragraph DEFINITIONS, and property damage mishaps resulting in at least $20,000 in damages, to establish the root cause(s) of the mishap. Complete the VA Form 2162 (or equivalent), and provide the report to the Contracting Officer or Administrative Contracting Officer within 5 calendar days of the accident. The Contracting Officer Representative or Government Designated Authority will provide copies of any required or special forms.

C. A summation of all man-hours worked by the contractor and associated sub-contractors for each month will be reported to Administrative Contracting Officer.

D. A summation of all Minor, Moderate, and Major incidents experienced on site by the contractor and associated sub-contractors for each month will be provided to the Contracting Officer or Administrative Contracting Officer monthly. The contractor and associated sub-contractors' OSHA 300 logs will be made available to the Contracting Officer or Administrative Contracting Officer upon request.

1.13 PERSONAL PROTECTIVE EQUIPMENT (PPE):

A. PPE is governed in all areas by the nature of the work the employee is performing. For example, specific PPE required for performing work on electrical equipment is identified in NFPA 70E, Standard for Electrical Safety in the Workplace.

B. Mandatory PPE includes:

1. Hard Hats – unless written authorization is given by the Contracting Officer or Administrative Contracting Officer in circumstances of work operations that have limited potential for falling object hazards such as during finishing work or minor remodeling. With authorization to relax the requirement of hard hats, if a worker becomes exposed to an overhead falling object hazard, then hard hats would be required in accordance with the OSHA and/or EM 385-1-1 regulations.

2. Safety glasses - unless written authorization is given by the Contracting Officer or Administrative Contracting Officer in circumstances of no eye hazards, appropriate safety glasses meeting the ANSI Z.87.1 standard must be worn by each person on site.

3. Appropriate Safety Shoes – based on the hazards present, safety shoes meeting the requirements of ASTM F2413-11 will be worn by each person on site unless written authorization is given by Contracting Officer or Administrative Contracting Officer in circumstances of no foot hazards.

4. Hearing protection - Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks.

1.14 FIRE SAFETY

A. Fire Safety Plan: Establish and maintain a site-specific fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare a plan detailing project-specific fire safety measures, including periodic status reports, and submit to Contracting Officer or Administrative Contracting Officer for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. This plan may be an element of the Accident Prevention Plan.

B. Site and Building Access: Maintain free and unobstructed access to facility emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.

C. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6 m (20 feet) exposing overall length, separate by 3m (10 feet).

D. Temporary Construction Partitions:

E. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.

F. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with Resident Engineer or Contracting Officer or Administrative Contracting Officer.

G. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to Resident Engineer or Contracting Officer or Administrative Contracting Officer.

H. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.

I. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.

J. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Resident Engineer. Obtain permits at least 48 hours in advance. Designate contractor's responsible project-site fire prevention program manager to permit hot work.

K. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to Resident Engineer or Contracting Officer or Administrative Contracting Officer.

L. Smoking: Smoking is prohibited in and adjacent to construction areas inside existing buildings and additions under construction. In separate and detached buildings under construction, smoking is prohibited except in designated smoking rest areas.

M. Dispose of waste and debris in accordance with NFPA 241. Remove from buildings daily.

N. If required, submit documentation to the Resident Engineer, COR or other Government Designated Authority that personnel have been trained in the fire safety aspects of working in areas with impaired structural or compartmentalization features.

1.15 ELECTRICAL

A. All electrical work will comply with NFPA 70 (NEC), NFPA 70B, NFPA 70E, 29 CFR Part 1910 Subpart J – General Environmental Controls, 29 CFR Part 1910 Subpart S – Electrical, and 29 CFR 1926 Subpart K in addition to other references required by contract.

B. All qualified persons performing electrical work under this contract will be licensed journeyman or master electricians. All apprentice electricians performing under this contract will be deemed unqualified persons unless they are working under the immediate supervision of a licensed electrician or master electrician.

C. All electrical work will be accomplished de-energized and in the Electrically Safe Work Condition (refer to NFPA 70E for Work Involving Electrical Hazards, including Exemptions to Work Permit). Any Contractor, subcontractor or temporary worker who fails to fully comply with this requirement is subject to immediate termination. Only in

rare circumstance where achieving an electrically safe work condition prior to beginning work would increase or cause additional hazards or is infeasible due to equipment design or operational limitations is energized work permitted. The Contracting Officer or Administrative Contracting Officer with approval of the Medical Center Director will make the determination if the circumstances would meet the exception outlined above. An AHA and permit specific to energized work activities will be developed, reviewed, and accepted by the VA prior to the start of that activity.

1. Development of a Hazardous Electrical Energy Control Procedure is required prior to de-energization. A single Simple Lockout/Tagout Procedure for multiple work operations can only be used for work involving qualified person(s) de-energizing one set of conductors or circuit part source. Task specific Complex Lockout/Tagout Procedures are required at all other times.

2. Verification of the absence of voltage after de-energization and lockout/tagout is considered "energized electrical work" (live work) under NFPA 70E, and will only be performed by qualified persons wearing appropriate shock protective (voltage rated) gloves and arc rate personal protective clothing and equipment, using Underwriters Laboratories (UL) tested and appropriately rated contact electrical testing instruments or equipment appropriate for the environment in which they will be used.

3. Personal Protective Equipment (PPE) and electrical testing instruments will be readily available for inspection by the Resident Engineer, Contracting Officer or Administrative Contracting Officer.

D. Before beginning any electrical work, an Activity Hazard Analysis (AHA) will be conducted to include Shock Hazard and Arc Flash Hazard analyses (NFPA Tables can be used only as a last alterative and it is strongly suggested a full Arc Flash Hazard Analyses be conducted). Work will not begin until the AHA for the work activity and permit for energized work has been reviewed and accepted by the Resident Engineer, Contracting Officer or Administrative Contracting Officer and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.

E. Ground-fault circuit interrupters. GFCI protection will be provided where an employee is operating or using cord- and plug-connected tools related to construction activity supplied by 125-volt, 15-, 20-, or 30-ampere circuits. Where employees operate or use equipment supplied by greater than 125-volt, 15-, 20-, or 30- ampere circuits, GFCI protection or an assured equipment grounding conductor program will be implemented in accordance with NFPA 70E - 2015, Chapter 1, Article 110.4(C)(2).

1.16 FALL PROTECTION

A. The fall protection (FP) threshold height requirement is 4ft for ALL WORK, unless specified differently or the OSHA 29 CFR 1926 or EM 385-1-1 requirements are more stringent, to include steel erection activities, systems-engineered activities (prefabricated) metal buildings, residential (wood) construction and scaffolding work.

1. The use of a Safety Monitoring System (SMS) as a fall protection method is prohibited.

2. The use of Controlled Access Zone (CAZ) as a fall protection method is prohibited.

3. A Warning Line System (WLS) may ONLY be used on floors or flat or low-sloped roofs (between 0 - 18.4 degrees or 4:12 slope) and will be erected around all sides of the work area (See 29 CFR 1926.502(f) for construction of WLS requirements). Working within the WLS does not require FP. No worker will be allowed in the area between the roof or floor edge and the WLS without FP. FP is required when working outside the WLS.

4. Fall protection while using a ladder will be governed by the more stringent of OSHA and EM 385-1-1 requirements.

1.17 SCAFFOLDS AND OTHER WORK PLATFORMS

A. All scaffolds and other work platforms construction activities will comply with 29 CFR 1926 Subpart L.

B. The fall protection (FP) threshold height requirement is 4 ft as stated in Section 1.16.

C. The following hierarchy and prohibitions will be followed in selecting appropriate work platforms.

1. Scaffolds, platforms, or temporary floors will be provided for all work except that can be performed safely from the ground or similar footing.

2. Ladders less than 20 feet may be used as work platforms only when use of small hand tools or handling of light material is involved.

3. Ladder jacks, lean-to, and prop-scaffolds are prohibited.

4. Emergency descent devices will not be used as working platforms.

D. Contractors will use a scaffold tagging system in which all scaffolds are tagged by the Competent Person. Tags will be color-coded: green indicates the scaffold has been inspected and is safe to use; red indicates the scaffold is unsafe to use. Tags will be readily visible, made of materials that will withstand the environment in which they are used, be legible and will include:

1. The Competent Person's name and signature;

2. Dates of initial and last inspections.

E. Mast Climbing work platforms: When access ladders, including masts designed as ladders, exceed 20 ft (6 m) in height, positive fall protection will be used.

1.18 EXCAVATION AND TRENCHES

A. All excavation and trenching work will comply with 29 CFR 1926 Subpart P. Excavations less than 5 feet in depth require evaluation by the contractor's "Competent Person" (CP) for determination of the necessity of an excavation protective system where kneeing, laying in, or stooping within the excavation is required.

B. All excavations and trenches 24 inches in depth or greater will require a written trenching and excavation permit (NOTE – some States and other local jurisdictions require separate state/jurisdiction-issued excavation permits). The permit will have two sections, one section will be completed prior to digging or drilling and the other will be completed prior to personnel entering the excavations greater than 5 feet in depth. Each section of the permit will be provided to the

Resident Engineer, COR and/or Facility Safety Officer and/or other Government Designated Authority prior to proceeding with digging or drilling and prior to proceeding with entering the excavation. After completion of the work and prior to opening a new section of an excavation, the permit will be closed out and provided to the Resident Engineer, COR and/or Facility Safety Officer and/or other Government Designated Authority. The permit will be maintained onsite and the first section of the permit will include the following:

1. Estimated start time & stop time
2. Specific location and nature of the work.
3. Indication of the contractor's "Competent Person" (CP) in excavation safety with qualifications and signature. Formal course in excavation safety is required by the contractor's CP.
4. Indication of whether soil or concrete removal to an offsite location is necessary.
5. Indication of whether soil samples are required to determined soil contamination.
6. Indication of coordination with local authority (i.e. "One Call") or contractor's effort to determine utility location with search and survey equipment.
7. Indication of review of site drawings for proximity of utilities to digging/drilling.

The second section of the permit for excavations greater than five feet in depth will include the following:

1. Determination of OSHA classification of soil. Soil samples will be from freshly dug soil with samples taken from different soil type layers as necessary and placed at a safe distance from the excavation by the excavating equipment. A pocket penetronmeter will be utilized in determination of the unconfined compression strength of the soil for comparison against OSHA table (Less than 0.5 Tons/FT2 – Type C, 0.5 Tons/FT2 to 1.5 Tons/FT2 – Type B, greater than 1.5 Tons/FT2 – Type A without condition to reduce to Type B).

2. Indication of selected protective system (sloping/benching, shoring, shielding). When soil classification is identified as "Type A" or "Solid Rock", only shoring or shielding or Professional Engineer designed systems can be used for protection. A Sloping/Benching system may only be used when classifying the soil as Type B or Type C. Refer to Appendix B of 29 CFR 1926, Subpart P for further information on protective systems designs.

3. Indication of the spoil pile being stored at least 2 feet from the edge of the excavation and safe access being provided within 25 feet of the workers.

4. Indication of assessment for a potential toxic, explosive, or oxygen deficient atmosphere where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist. Internal combustion engine equipment is not allowed in an excavation without providing force air ventilation to lower the concentration to below OSHA PELs, providing sufficient oxygen levels, and atmospheric testing as necessary to ensure safe levels are maintained.

C. As required by OSHA 29 CFR 1926.651(b)(1), the estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, will be determined prior to opening an excavation.

1. The planned dig site will be outlined/marked in white prior to locating the utilities.

2. Used of the American Public Works Association Uniform Color Code is required for the marking of the proposed excavation and located utilities.

3. 811 will be called two business days before digging on all local or State lands and public Right-of Ways.

4. Digging will not commence until all known utilities are marked.

5. Utility markings will be maintained

D. Excavations will be hand dug or excavated by other similar safe and acceptable means as excavation operations approach within 3 to 5 feet of identified underground utilities. Exploratory bar or other detection equipment will be utilized as necessary to further identify the location of underground utilities.

E. Excavations greater than 20 feet in depth require a Professional Engineer designed excavation protective system.

1.19 CRANES

A. All crane work will comply with 29 CFR 1926 Subpart CC and EM 385-1-1.

B. Prior to operating a crane, the operator must be licensed, qualified or certified to operate the crane. Thus, all the provisions contained with Subpart CC are effective and there is no "Phase In" date.

C. A detailed lift plan for all lifts will be submitted to the Resident Engineer, COR and/or other Government Designated Authority 14 days prior to the scheduled lift complete with route for truck carrying load, crane load analysis, siting of crane and path of swing and all other elements of a critical lift plan where the lift meets the definition of a critical lift. Critical lifts require a more comprehensive lift plan to minimize the potential of crane failure and/or catastrophic loss. The plan must be reviewed and accepted by the General Contractor before being submitted to the VA for review. The lift will not be allowed to proceed without prior acceptance of this document.

D. Crane operators will not carry loads

1. over the general public or VAMC personnel

2. over any occupied building unless

a. the top two floors are vacated

b. or overhead protection with a design live load of 300 psf is provided

1.20 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

A. All installation, maintenance, and servicing of equipment or machinery will comply with 29 CFR 1910.147 except for specifically referenced

operations in 29 CFR 1926 such as concrete & masonry equipment [1926.702(j)], heavy machinery & equipment [1926.600(a)(3)(i)], and process safety management of highly hazardous chemicals (1926.64). Control of hazardous electrical energy during the installation, maintenance, or servicing of electrical equipment will comply with Section 1.15 to include NFPA 70E and other VA specific requirements discussed in the section.

1.21 CONFINED SPACE ENTRY

A. All confined space entry will comply with 29 CFR 1926, Subpart AA except for specifically referenced operations in 29 CFR 1926 such as excavations/trenches [1926.651(g)].

B. A site-specific Confined Space Entry Plan (including permitting process) will be developed and submitted to the Resident Engineer, COR and/or other Government Designated Authority.

1.22 WELDING AND CUTTING

As specified in section 1.14, Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Resident Engineer, COR and/or other Government Designated Authority. Obtain permits from Resident Engineer, COR and/or other Government Designated Authority at least 48 hours in advance. Designate contractor's responsible project-site fire prevention program manager to permit hot work.

1.23 LADDERS

A. All Ladder use will comply with 29 CFR 1926 Subpart X and EM 385-1-1.

B. All portable ladders will be of sufficient length and will be placed so that workers will not stretch or assume a hazardous position.

C. Manufacturer safety labels will be in place on ladders

D. Step Ladders will not be used in the closed position

E. Top steps or cap of step ladders will not be used as a step

D. Portable ladders, used as temporary access, will extend at least 3 ft (0.9 m) above the upper landing surface.

1. When a 3 ft (0.9-m) extension is not possible, a grasping device (such as a grab rail) will be provided to assist workers in mounting and dismounting the ladder.

2. In no case will the length of the ladder be such that ladder deflection under a load would, by itself, cause the ladder to slip from its support.

F. Ladders will be inspected for visible defects on a daily basis and after any occurrence that could affect their safe use. Broken or damaged ladders will be immediately tagged "DO NOT USE," or with similar wording, and withdrawn from service until restored to a condition meeting their original design.

1.24 FLOOR & WALL OPENINGS

A. All floor and wall openings will comply with 29 CFR 1926 Subpart M and EM 385-1-1.

B. Floor and roof holes/openings are any that measure over 2 in (51 mm) in any direction of a walking/working surface which persons may trip or fall into or where objects may fall to the level below. Skylights located in floors or roofs are considered floor or roof hole/openings.

C. All floor, roof openings or hole into which a person can accidentally walk or fall through will be guarded either by a railing system with toe boards along all exposed sides or a load-bearing cover. When the cover is not in place, the opening or hole will be protected by a removable guardrail system or will be attended when the guarding system has been removed, or other fall protection system.

1. Covers will be capable of supporting, without failure, at least twice the weight of the worker, equipment and material combined.

2. Covers will be secured when installed, clearly marked with the word “HOLE”, “COVER” or “Danger, Roof Opening-Do Not Remove” or color-coded or equivalent methods (e.g., red or orange “X”). Workers must be made aware of the meaning for color coding and equivalent methods.

3. Roofing material, such as roofing membrane, insulation or felts, covering or partly covering openings or holes, will be immediately cut out. No hole or opening will be left unattended unless covered.

4. Non-load-bearing skylights will be guarded by a load-bearing skylight screen, cover, or railing system along all exposed sides.

5. Workers are prohibited from standing/walking on skylights.

- - - E N D - - -

SECTION 01 45 00
QUALITY CONTROL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

36 CFR 1191	**Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines (Amendment 2)**

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)

ASHRAE 52.2	(2007; Addenda B 2008; Errata 2009, Errata 2010; INT 2010; Errata 2011) Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size

ASTM INTERNATIONAL (ASTM)

ASTM D6245	(2007) Using Indoor Carbon Dioxide Concentrations to Evaluate Indoor Air Quality and Ventilation
ASTM D6345	(2010) Selection of Methods for Active, Integrative Sampling of Volatile Organic Compounds in Air

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

ANSI/SMACNA 008	(2007) IAQ Guidelines for Occupied Buildings Under Construction, 2nd Edition

1.2 SUBMITTALS

Government approval by the Contracting Officer or the Administrative Contracting Officer (CO/ACO) is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval; the Government reserves the right to review and comment on submittals not having a "G" designation; and submittals with an "L" are for LEED review. LEED review will be performed by the Contractor's LEED Coordinator and the LEED Administrator. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES, Section 01 33 23 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, and Section 01 33 29 LEED(TM) DOCUMENTATION as applicable:

SD-01 Preconstruction Submittals

Construction Quality Control (QC) Plan; G

Submit a Construction QC Plan prior to start of construction.

Indoor Air Quality (IAQ) Management Plan; G, L
Basis of Design and Design Intent

1.3 INFORMATION FOR THE CO/ACO

Prior to commencing work on construction, the Contractor can obtain a single copy set of the current report forms from the SRE/CO. The report forms will consist of the Contractor Production Report, Contractor Production Report (Continuation Sheet), Contractor Quality Control (CQC) Report, (CQC) Report (Continuation Sheet), Preparatory Phase Checklist, Initial Phase Checklist, Rework Items List, and Testing Plan and Log.

Deliver the following to the (CO/ACO) during Construction:

a. CQC Report: Mail or hand-carry the original (wet signatures) and one copy by 10:00 AM the next working day after each day that work is performed and for every 7 consecutive calendar days of no-work.

b. Contractor Production Report: Submit the report electronically by 10:00 AM the next working day after each day that work is performed and for every 7 consecutive calendar days of no-work. Mail or hand-carry the original (wet signatures) and one copy by 10:00 AM the next working day after each day that work is performed and for every 7 consecutive calendar days of no-work, attached to the CQC Report.

c. Preparatory Phase Checklist: Submit the report electronically in the same manner as the CQC Report for each Preparatory Phase held.

d. Initial Phase Checklist: Submit the report electronically in the same manner as the CQC Report for each Initial Phase held.

f. Field Test Reports: Within two working days after the test is performed, submit the report as an electronic attachment to the CQC Report.

g. Monthly Summary Report of Tests: Submit the report as an electronic attachment to the CQC Report at the end of each month.

h. Testing Plan and Log: Submit the report as an electronic attachment to the CQC Report, at the end of each month.

i. Rework Items List: Submit lists containing new entries daily, in the same manner as the CQC Report.

j. CQC Meeting Minutes: Within two working days after the meeting is held, submit the report as an electronic attachment to the CQC Report.

k. QC Certifications: As required by the paragraph entitled "QC Certifications".

1.4 QC PROGRAM REQUIREMENTS

Establish and maintain a QC program as described in this section. **This QC program is a key element in meeting the objectives of VA's Commissioning requirements, compliance with contract documents, and applicable codes and regulations.** The QC program consists of a QC Organization, QC Plan, QC Plan Meeting(s), a Coordination and Mutual Understanding Meeting, QC meetings, three phases of control, submittal review and approval, testing, completion inspections, and QC certifications and documentation necessary to provide materials, equipment, workmanship, fabrication, construction and operations which comply with the requirements of this Contract. The QC program must cover on-site and off-site work and be coordinated with the work sequence. No construction work or testing may be performed unless the QC Manager is on the work site. The QC Manager must report to an officer of the firm and not be subordinate to the Project Superintendent or the Project Manager. The QC Manager, Project Superintendent and Project Manager must work together effectively. Although the QC Manager is the primary individual responsible for quality control, all individuals will be held responsible for the quality of work on the job.

1.4.1 Acceptance of the Construction Quality Control (QC) Plan

Acceptance of the QC Plan is required prior to the start of construction. The CO/ACO reserves the right to require changes in the QC Plan and operations as necessary, including removal of personnel, to ensure the specified quality of work. The CO/ACO reserves the right to interview any member of the QC organization at any time in order to verify the submitted qualifications. All QC personnel are subject to acceptance by the (SRE/CO). The CO/ACO may require the removal of any individual for non-compliance with quality requirements specified in the Contract.

1.4.2 Preliminary Construction Work Authorized Prior to Acceptance

The only construction work that is authorized to proceed prior to the acceptance of the QC Plan is mobilization of storage and office trailers, temporary utilities, and surveying.

1.4.3 Notification of Changes

Notify the (SRE/CO), in writing, of any proposed changes in the QC Plan or changes to the QC organization personnel, a minimum of 10 workdays prior to a proposed change. The proposed changes are subject to acceptance by the (SRE/CO).

1.4.5 Compliance with Architectural Barriers Act Accessibility Standards

The Architectural Barriers Act (ABA) requires all construction, renovation, or leasing with federal funds to meet the Architectural Barriers Act Accessibility Standard (ABAAS). The Contractor is required to know and apply these Standards, 36 CFR 1191, and program requirements.

1.5 QC ORGANIZATION

1.5.1 QC Manager

1.5.1.1 Duties

Provide a QC Manager at the work site to implement and manage the QC program. The QC Manager will report directly to the Project Manager and Company President. The QC Manager will be on-site when work is being performed by the prime and/or sub-contractors. The QC Manager will document all non-conforming conditions, items and/or workmanship.

The QC Manager is required to attend the partnering meetings, QC Plan Meetings, Coordination and Mutual Understanding Meeting, conduct the QC meetings, perform the three phases of control, perform submittal review and approval, ensure testing is performed and provide QC certifications and documentation required in this Contract. The QC Manager is responsible for managing and coordinating the three phases of control and documentation performed by testing laboratory personnel and any other inspection and testing personnel required by this Contract. The QC Manager is the manager of all QC activities including all Subcontractors.

1.5.1.2 Qualifications

An individual with a minimum of 5 years combined experience in the following positions: Project Superintendent, QC Manager, Project Manager, Project Engineer or Construction Manager on similar size and type construction contracts which included the major trades that are part of this Contract. The individual must have at least two years' experience as a QC Manager. The individual must have experience in the areas of hazard identification, safety compliance, and sustainability.

1.5.2 Construction Quality Management Training

In addition to the above experience and education requirements, the QC Manager must have completed the course entitled "Construction Quality Management (CQM) for Contractors". If the QC Manager does not have a current certification, they must obtain the CQM for Contractors course certification within 90 days of award. This course is periodically offered by the Naval Facilities Engineering Command and the Army Corps of Engineers. Contact the agencies for information on the next scheduled class.

1.5.3 Alternate QC Manager Duties and Qualifications

Designate an alternate for the QC Manager at the work site to serve in the event of the designated QC Manager's absence. The period of absence may not exceed two weeks at one time, and not more than 30 workdays during a calendar year. The qualification requirements for the Alternate QC Manager must be the same as for the QC Manager.

1.6 QUALITY CONTROL (QC) PLAN

1.6.1 Construction Quality Control (QC) Plan

1.6.1.1 Requirements

Provide, for acceptance by the CO/ACO, a Construction QC Plan submitted in a three-ring binder that includes a table of contents, with major sections identified with tabs, with pages numbered sequentially, and that documents

the proposed methods and responsibilities for accomplishing commissioning activities during the construction of the project:

a. QC ORGANIZATION: A chart showing the QC organizational structure.
b. NAMES AND QUALIFICATIONS: Names and qualifications, in resume format, for each person in the QC organization. Include the CQM for Contractors course certifications for the QC Manager and Alternate QC Manager as required by the paragraphs entitled "Construction Quality Management Training" and "Alternate QC Manager Duties and Qualifications".

c. DUTIES, RESPONSIBILITY AND AUTHORITY OF QC PERSONNEL: Duties, responsibilities, and authorities of each person in the QC organization.

d. OUTSIDE ORGANIZATIONS: A listing of outside organizations, such as architectural and consulting engineering firms, that will be employed by the Contractor and a description of the services these firms will provide.

e. APPOINTMENT LETTERS: Letters signed by an officer of the firm appointing the QC Manager and Alternate QC Manager and stating that they are responsible for implementing and managing the QC program as described in this Contract. Include in this letter the responsibility of the QC Manager and Alternate QC Manager to implement and manage the three phases of control, and their authority to stop work which is not in compliance with the Contract. Letters of direction are to be issued by the QC Manager to all other QC Specialists outlining their duties, authorities, and responsibilities. Include copies of the letters in the QC Plan.

f. SUBMITTAL PROCEDURES AND INITIAL SUBMITTAL REGISTER: Procedures for reviewing, approving, and managing submittals. Provide the name(s) of the person(s) in the QC organization authorized to review and certify for completeness submittals prior to approval. Provide the initial submittal of the Submittal Register as specified in Section 01 33 00 SUBMITTAL PROCEDURES.

g. TESTING LABORATORY INFORMATION: Testing laboratory information required by the paragraphs entitled "Accreditation Requirements", as applicable.

h. TESTING PLAN AND LOG: A Testing Plan and Log that includes the tests required, referenced by the specification paragraph number requiring the test, the frequency, and the person responsible for each test. Use Government forms to log and track tests.

i. PROCEDURES TO COMPLETE REWORK ITEMS: Procedures to identify, record, track, and complete rework items. Provide a sample rework item list including fields for the date the item was identified, description of the item, referenced requirement (specification, code, standard, etc.), action proposed or taken by Contractor, and date completed. Procedures to identify, record, track, and complete rework items. Use Government forms to record and track rework items.

j. DOCUMENTATION PROCEDURES: Use Government form.

k. LIST OF DEFINABLE FEATURES: A Definable Feature of Work (DFOW) is a task that is separate and distinct from other tasks and has control requirements and work crews unique to that task. A DFOW is identified by different trades or disciplines and is an item or activity on the construction schedule. Include all activities for which this specification requires QC Specialists or specialty inspection personnel. Provide separate DFOWs in the Network Analysis Schedule for each design development stage and submittal package.

l. PROCEDURES FOR PERFORMING THE THREE PHASES OF CONTROL: Identify procedures used to ensure the three phases of control to manage the quality on this project. For each DFOW, a Preparatory and Initial phase checklist will be filled out during the Preparatory and Initial phase meetings. Conduct the Preparatory and Initial Phases and meetings with a view towards obtaining quality construction by planning ahead and identifying potential problems for each DFOW.

m. PERSONNEL MATRIX: Not Applicable.

n. PROCEDURES FOR COMPLETION INSPECTION: Procedures for identifying and documenting the completion inspection process. Include in these procedures the responsible party for punch out inspection, pre-final inspection, and final acceptance inspection.

o. TRAINING PROCEDURES AND TRAINING LOG: Not Applicable.

p. ORGANIZATION AND PERSONNEL CERTIFICATIONS LOG: Procedures for coordinating, tracking and documenting all certifications on Subcontractors, testing laboratories, suppliers, personnel, etc. QC Manager will ensure that certifications are current, appropriate for the work being performed, and will not lapse during any period of the contract that the work is being performed.

1.7 QC PLAN MEETINGS

Prior to submission of the QC Plan, the QC Manager will meet with the CO/ACO to discuss the QC Plan requirements of this Contract. The purpose of this meeting is to develop a mutual understanding of the QC Plan requirements prior to plan development and submission and to agree on the Contractor's list of DFOWs.

1.8 COORDINATION AND MUTUAL UNDERSTANDING MEETING

After submission of the QC Plan, and prior to the start of construction, the QC Manager will meet with the CO/ACO to present the QC program required by this Contract. When a new QC Manager is appointed, the coordination and mutual understanding meeting will be repeated.

1.8.1 Purpose

The purpose of this meeting is to develop a mutual understanding of the QC details, including documentation, administration for on-site and off-site work, design intent, Cx, environmental requirements and procedures, coordination of activities to be performed, and the coordination of the

Contractor's management, production, and QC personnel. At the meeting, the Contractor will be required to explain in detail how three phases of control will be implemented for each DFOW, as well as how each DFOW will be affected by each management plan or requirement as listed below:

a. Waste Management Plan.

b. IAQ Management Plan.

c. Procedures for noise and acoustics management.

d. Environmental Protection Plan.

e. Environmental regulatory requirements.

f. Cx Plan.

g. Architectural Barriers Act Accessibility Standard. (Amendment 2)

1.8.2 Coordination of Activities

Coordinate activities included in various sections to ensure efficient and orderly installation of each component. Coordinate operations included under different sections that are dependent on each other for proper installation and operation.

1.8.3 Attendees

As a minimum, the Contractor's personnel required to attend include an officer of the firm, the Project Manager, Project Superintendent, QC Manager, Alternate QC Manager, A/E, CA, Environmental Manager, and Subcontractor representatives. Each Subcontractor who will be assigned QC responsibilities will have a principal of the firm at the meeting. Minutes of the meeting will be prepared by the QC Manager and signed by the Contractor and the CO/ACO. Provide a copy of the signed minutes to all attendees and will be included in the QC Plan.

1.9 QC MEETINGS

After the start of construction, conduct QC meetings once every two weeks by the QC Manager at the work site with the Project Superintendent, the CA, and the foremen who are performing the work of the DFOWs. The QC Manager is to prepare the minutes of the meeting and provide a copy to the CO/ACO within two working days after the meeting. The CO/ACO may attend these meetings. As a minimum, accomplish the following at each meeting:

a. Review the minutes of the previous meeting.

b. Review the schedule and the status of work and rework.

c. Review the status of submittals.

d. Review the work to be accomplished in the next two weeks and documentation required.

e. Resolve QC and production problems (RFI, etc.).

f. Address items that may require revising the QC Plan.

g. Review Accident Prevention Plan (APP).

h. Review environmental requirements and procedures.

i. Review Waste Management Plan.

j. Review IAQ Management Plan.

k. Review Environmental Management Plan.

l. Review the status of training completion.

1.10 DESIGN REVIEW AND DOCUMENTATION

1.10.1 Basis of Design and Design Intent

Review the basis of design received from the CO/ACO.

1.10.2 Design Review

Review design documents to verify that each commissioned system meets the design intent relative to functionality, energy performance, water performance, maintainability, sustainability, system cost, indoor environmental quality, and local environmental impacts. Fully document review in written report.

1.10.3 Contract Document Review

Review the Contract documents to verify that Cx is adequately specified, and that each commissioned system is likely to meet the design intent relative to functionality, energy performance, water performance, maintainability, sustainability, system cost, indoor environmental quality, and local environmental impacts.

1.11 THREE PHASES OF CONTROL

Adequately cover both on-site and off-site work with the Three Phases of Control and include the following for each DFOW.

1.11.1 Preparatory Phase

Notify the CO/ACO at least two workdays in advance of each preparatory phase meeting. The meeting will be conducted by the QC Manager and attended by the Project Superintendent, Safety Manager, the CA, and the foreman responsible for the DFOW. When the DFOW will be accomplished by a Subcontractor, that Subcontractor's foreman (the leader of the work crew accomplishing the DFOW and who will be present on site for the duration of the work) will attend the preparatory phase meeting. Document the results of the preparatory phase actions in the daily Contractor Quality Control Report and in the Preparatory Phase Checklist. Perform the following prior to beginning work on each DFOW:

a. Review each paragraph of the applicable specification sections.

b. Review the Contract drawings.

c. Verify that field measurements are as indicated on construction and/or shop drawings before confirming product orders, to minimize waste due to excessive materials.

d. Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required.

e. Review the testing plan and ensure that provisions have been made to provide the required QC testing.

f. Examine the work area to ensure that the required preliminary work has been completed.

g. Coordinate the schedule of product delivery to designated prepared areas to minimize site storage time and potential damage to stored materials.

h. Arrange for the return of shipping/packaging materials, such as wood pallets, where economically feasible.

i. Examine the required materials, equipment and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data.

j. Discuss specific controls used and construction methods, construction tolerances, workmanship standards, and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each DFOW.

k. Review the APP and appropriate Activity Hazard Analysis (AHA) to ensure that applicable safety requirements are met, and that required Material Safety Data Sheets (MSDS) are submitted.

l. Schedule the date/time for the initial inspection.

1.11.2 Initial Phase

The Initial Phase inspection will be conducted as soon as a representative portion of the work is completed. Notify the CO/ACO at least two workdays in advance of each initial phase. When construction crews are ready to start work on a DFOW, conduct the initial phase with the Project Superintendent, and the foreman responsible for that DFOW. Observe the initial segment of the DFOW to ensure that the work complies with Contract requirements. Document the results of the initial phase in the daily CQC Report and in the Initial Phase Checklist. Repeat the initial phase for each new crew to work on-site, or when acceptable levels of specified quality are not met. Perform the following for each DFOW:

a. Establish the quality of workmanship required.

b. Resolve conflicts.

c. Ensure that testing is performed by the approved laboratory.

d. Check work procedures for compliance with the APP and the appropriate AHA to ensure that applicable safety requirements are met.

1.11.3 Follow-Up Phase

Perform the following for on-going work daily, or more frequently as necessary, until the completion of each DFOW and document in the daily CQC Report:

a. Ensure the work follows Contract requirements.

b. Maintain the quality of workmanship required.

c. Ensure that testing is performed by the approved laboratory.

d. Ensure that rework items are being corrected.

e. Assure manufacturers' representatives have performed necessary inspections if required and perform safety inspections.

1.11.4 Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same DFOW if the quality of on-going work is unacceptable, if there are changes in the applicable QC organization, if there are changes in the on-site production supervision or work crew, if work on a DFOW is resumed after substantial period of inactivity, or if other problems develop.

1.11.5 Notification of Three Phases of Control for Off-Site Work

Notify the CO/ACO at least two weeks prior to the start of the preparatory and initial phases.

1.12 SUBMITTAL REVIEW AND APPROVAL

Procedures for submission, review and approval of submittals are described in Section 01 33 00 SUBMITTAL PROCEDURES.

1.13 TESTING

Except as stated otherwise in the specification sections, perform sampling and testing required under this Contract.

1.13.1 Accreditation Requirements

Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (E 329, C 1077, D 3666, D 3740, A 880, E 543) listed in the technical sections of the specifications. Laboratories engaged in Hazardous Materials Testing will meet the requirements of OSHA and EPA. The policy applies to the specific laboratory performing the actual testing, not just the Corporate Office.

1.13.2 Laboratory Accreditation Authorities

Laboratory Accreditation Authorities include the National Voluntary Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology at http://ts.nist.gov/ts/htdocs/210/214/214.htm , the American Association of State Highway and Transportation Officials (AASHTO) program at http://www.transportation.org/aashto/home.nsf/frontpage , International Accreditation Services, Inc. (IAS) at http://www.iasonline.org, U. S. Army Corps of Engineers Materials Testing Center (MTC)at http://www.wes.army.mil/SL/MTC/, the American Association for Laboratory Accreditation (A2LA) program at http://www.a2la.org/, the Washington Association of Building Officials (WABO) at http://www.wabo.org/ (Approval authority for WABO is limited to projects within Washington State), and the Washington Area Council of Engineering Laboratories (WACEL) at http://www.wacel.org/labaccred.html (Approval authority by WACEL is limited to projects within Facilities Engineering Command (FEC) Washington geographical area).

1.13.3 Capability Check

The CO/ACO retains the right to check laboratory equipment in the proposed laboratory and the laboratory technician's testing procedures, techniques, and other items pertinent to testing, for compliance with the standards set forth in this Contract.

1.13.4 Test Results

Cite applicable Contract requirements, tests or analytical procedures used. Provide actual results and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. If the item fails to conform, notify the CO/ACO immediately. Conspicuously stamp the cover sheet for each report in large red letters "CONFORMS" or "DOES NOT CONFORM" to the specification requirements, whichever is applicable. Test results must be signed by a testing laboratory representative authorized to sign certified test reports. Furnish the signed reports, certifications, and other documentation to the CO/ACO via the QC Manager. Furnish a summary report of field tests at the end of each month, per the paragraph entitled "INFORMATION FOR THE CONTRACTING OFFICER".

1.13.5 Test Reports and Monthly Summary Report of Tests

Furnish the signed reports, certifications, and a summary report of field tests at the end of each month to the (SRE/CO). Attach a copy of the summary report to the last daily Contractor Quality Control Report for each month. Provide a copy of the signed test reports and certifications to the OMSI preparer for inclusion into the OMSI documentation.

1.14 QC CERTIFICATIONS

1.14.1 CQC Report Certification

Contain the following statement within the CQC Report: "On behalf of the Contractor, I certify that this report is complete and correct and equipment and material used, and work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge, except as noted in this report".

1.14.2 Invoice Certification

Furnish a certificate to the CO/ACO with each payment request, signed by the QC Manager, attesting that as-built drawings are current, coordinated and attesting that the work for which payment is requested, including stored material, follows Contract requirements.

1.14.3 Completion Certification

Upon completion of work under this Contract, the QC Manager will furnish a certificate to the CO/ACO attesting that "the work has been completed, inspected, tested and is in compliance with the Contract". Provide a copy of this final QC Certification for completion to the OMSI preparer for inclusion into the OMSI documentation.

1.15 COMPLETION INSPECTIONS

1.15.1 Punch-Out Inspection

Near the completion of all work or any increment thereof, established by a completion time stated in the Contract Clause entitled "Commencement, Prosecution, and Completion of Work", or stated elsewhere in the specifications, the QC Manager and the CA must conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings, specifications and Contract. Include in the punch list any remaining items on the "Rework Items List", which were not corrected prior to the Punch-Out Inspection. Include within the punch list the estimated date by which the deficiencies will be corrected. Provide a copy of the punch list to the (SRE/CO). The QC Manager, or staff, must make follow-on inspections to ascertain that all deficiencies have been corrected. Once this is accomplished, notify the Government that the facility is ready for the Government "Pre-Final Inspection".

1.15.2 Pre-Final Inspection

The Government and QCM will perform this inspection to verify that the facility is complete and ready to be occupied. A Government "Pre-Final Punch List" will be documented by the CQM because of this inspection. The QC Manager will ensure that all items on this list are corrected prior to notifying the Government that a "Final" inspection with the Client can be scheduled. Any items noted on the "Pre-Final" inspection must be corrected in a timely manner and be accomplished before the contract completion date for the work, or any increment thereof, if the project is divided into increments by separate completion dates.

1.15.3 Final Acceptance Inspection

Notify the CO/ACO at least 14 calendar days prior to the date a final acceptance inspection can be held. State within the notice that all items previously identified on the pre-final punch list will be corrected and acceptable, along with any other unfinished Contract work, by the date of the final acceptance inspection. The Contractor must be represented by the QC Manager, the Project Superintendent, the CA, and others deemed necessary. Attendees for the Government will include the (SRE/CO), other VA/NCA personnel, and personnel representing the Client. Failure of the Contractor to have all contract work acceptably complete for this inspection will be

cause for the CO/ACOto bill the Contractor for the Government's additional inspection cost in accordance with the Contract Clause entitled "Inspection of Construction".

1.16 DOCUMENTATION

Maintain current and complete records of on-site and off-site QC program operations and activities.

1.16.1 Construction Documentation

Reports are required for each day that work is performed and must be attached to the Contractor Quality Control Report prepared for the same day. Maintain current and complete records of on-site and off-site QC program operations and activities. The forms identified under the paragraph "INFORMATION FOR THE CONTRACTING OFFICER" will be used. Reports are required for each day work is performed. Account for each calendar day throughout the life of the Contract. Every space on the forms must be filled in. Use N/A if nothing can be reported in one of the spaces. The Project Superintendent and the QC Manager must prepare and sign the Contractor Production and CQC Reports, respectively. The reporting of work must be identified by terminology consistent with the construction schedule. In the "remarks" sections of the reports, enter pertinent information including directions received, problems encountered during construction, work progress and delays, conflicts or errors in the drawings or specifications, field changes, safety hazards encountered, instructions given and corrective actions taken, delays encountered and a record of visitors to the work site, quality control problem areas, deviations from the QC Plan, construction deficiencies encountered, meetings held. For each entry in the report(s), identify the Schedule Activity No. that is associated with the entered remark.

1.16.2 Quality Control Validation

Establish and maintain the following in a series of three ring binders. Binders will be divided and tabbed as shown below. These binders must be readily available to the CO/ACO during all business hours.

a. All completed Preparatory and Initial Phase Checklists, arranged by specification section.

b. All milestone inspections, arranged by Activity Number.

c. An up-to-date copy of the Testing Plan and Log with supporting field test reports, arranged by specification section.

d. Copies of all contract modifications, arranged in numerical order. Also include documentation that modified work was accomplished.

e. An up-to-date copy of the Rework Items List.

f. Maintain up-to-date copies of all punch lists issued by the QC staff to the Contractor and Sub-Contractors and all punch lists issued by the Government.

1.16.3 Testing Plan and Log

As tests are performed, the CA and the QC Manager will record on the "Testing Plan and Log" the date the test was performed and the date the test results were forwarded to the (SRE/CO). Attach a copy of the updated "Testing Plan and Log" to the last daily CQC Report of each month, per the paragraph "INFORMATION FOR THE CONTRACTING OFFICER". Provide a copy of the final "Testing Plan and Log" to the OMSI preparer for inclusion into the OMSI documentation.

1.16.4 Rework Items List

The QC Manager must maintain a list of work that does not comply with the Contract, identifying what items need to be reworked, the date the item was originally discovered, the date the item will be corrected by, and the date the item was corrected. There is no requirement to report a rework item that is corrected the same day it is discovered, however, such reporting is an indication that the QC program is working. Attach a copy of the "Rework Items List" to the last daily CQC Report of each month. The Contractor is responsible for including those items identified by the (SRE/CO).

1.16.5 As-Built Drawings

The QC Manager is required to ensure the as-built drawings are kept current on a daily basis and marked to show deviations which have been made from the Contract drawings. Ensure each deviation has been identified with the appropriate modifying documentation (e.g. PC No., Modification No., Request for Information No., etc.). The QC Manager must initial each revision. Upon completion of work, the QC Manager will furnish a certificate attesting to the accuracy of the as-built drawings prior to submission to the (SRE/CO).

1.17 NOTIFICATION ON NON-COMPLIANCE

The CO/ACO will notify the Contractor of any detected non-compliance with the Contract. Take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, will be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the CO/ACO may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders will be made the subject of claim for extension of time for excess costs or damages by the Contractor.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PREPARATION

Designate receiving/storage areas for incoming material to be delivered according to installation schedule and to be placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. Store and handle materials in a manner as to prevent loss from weather and other damage. Keep materials, products, and accessories covered and off the ground, and store in a dry, secure area. Prevent

contact with material that may cause corrosion, discoloration, or staining. Protect all materials and installations from damage by the activities of other trades.

-- End of Section --

SECTION 01 45 29
TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies materials testing activities and inspection services required during project construction to be provided by a third-party Testing Laboratory retained and paid for by Contractor. Refer to Section 01 00 01, GENERAL REQUIREMENTS, for additional information.

1.2 RELATED DOCUMENTS

A. Section 01 00 01, GENERAL REQUIREMENTS.

1.3 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

B. American Association of State Highway and Transportation Officials (AASHTO):

T27-11	Sieve Analysis of Fine and Coarse Aggregates
T96-02(R2006)	Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
T99-10	The Moisture-Density Relations of Soils Using a 2.5 Kg (5.5 lb.) Rammer and a 305 mm (12 in.) Drop
T104-99(R2007)	Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
T180-10	Moisture-Density Relations of Soils using a 4.54 kg (10 lb.) Rammer and a 457 mm (18 in.) Drop
T191-02(R2006)	Density of Soil In-Place by the Sand-Cone Method

C. American Society for Testing and Materials (ASTM):

A325-10	Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
A370-12a	Definitions for Mechanical Testing of Steel Products

A490-12	Heat Treated Steel Structural Bolts, 150 ksi Minimum Tensile Strength
C31/C31M-12	Making and Curing Concrete Test Specimens in the Field
C33/C33M-13	Concrete Aggregates
C39/C39M-12	Compressive Strength of Cylindrical Concrete Specimens
C109/C109M-12	Compressive Strength of Hydraulic Cement Mortars
C138/C138M-12a	Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
C140-13	Sampling and Testing Concrete Masonry Units and Related Units
C143/C143M-12	Slump of Hydraulic Cement Concrete
C172/C172M-10	Sampling Freshly Mixed Concrete
C173/C173M-12	Air Content of freshly Mixed Concrete by the Volumetric Method
C330/C33OM-09	Lightweight Aggregates for Structural Concrete
C567/C567M-11	Density Structural Lightweight Concrete
C780-12a	Pre-construction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
C1019-11	Sampling and Testing Grout
C1064/C1064M-12	Freshly Mixed Hydraulic Cement Concrete
C1077-13	Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
C1314-12	Compressive Strength of Masonry Prisms
C1364-10b	Architectural Cast Stone
D698-12	Laboratory Compaction Characteristics of Soil Using Standard Effort
D1143/D1143M-07	Deep Foundations Under Static Axial Compressive Load
D1188-07	Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens
D1556-07	Density and Unit Weight of Soil in Place by the Sand-Cone Method

D1557-12	Laboratory Compaction Characteristics of Soil Using Modified Effort
D2166-06	Unconfined Compressive Strength of Cohesive Soil
D2167-08	Density and Unit Weight of Soil in Place by the Rubber Balloon Method
D2216-10	Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
D2974-07	Moisture, Ash, and Organic Matter of Peat and Other Organic Soils
D3666-11	Minimum Requirements for Agencies Testing and Inspection Bituminous Paving Materials
D3740-12a	Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock
E94-04(2010)	Radiographic Examination
E164-08	Contact Ultrasonic Testing of Weldments
E329-11c	Agencies Engaged in Construction Inspection, Testing, or Special Inspection
E543-13	Agencies Performing Nondestructive Testing
E709-08	Guide for Magnetic Particle Testing
E1155-96(2008)	Determining FF Floor Flatness and FL Floor Levelness Numbers

D. American Welding Society (AWS):

D1.1-07	Structural Welding Code-Steel

1.4 REQUIREMENTS

A. Accreditation Requirements: Third party Testing Laboratory retained and paid for by Contractor must be accredited by one or more of the National Voluntary Laboratory Accreditation Program (NVLAP) programs acceptable in the geographic region for the project. Furnish to the Senior Resident Engineer or Contracting Officer (SRE/CO) a copy of the Certificate of Accreditation and Scope of Accreditation. For testing laboratories that have not yet obtained accreditation by a NVLAP program, submit an acknowledgement letter from one of the laboratory accreditation authorities indicating that the application for accreditation has been received and the accreditation process has started, and submit to the SRE/CO for approval, certified statements, signed by an official of the testing laboratory attesting that the

proposed laboratory, meets or conforms to the ASTM standards listed below as appropriate to the testing field.

1. Laboratories engaged in testing of construction materials must meet the requirements of ASTM E329.
2. Laboratories engaged in testing of concrete and concrete aggregates must meet the requirements of ASTM C1077.
3. Laboratories engaged in testing of bituminous paving materials must meet the requirements of ASTM D3666.
4. Laboratories engaged in testing of soil and rock, as used in engineering design and construction, must meet the requirements of ASTM D3740.
5. Laboratories engaged in inspection and testing of steel, stainless steel, and related alloys will be evaluated according to ASTM A880.
6. Laboratories engaged in non-destructive testing (NDT) must meet the requirements of ASTM E543.
7. Laboratories engaged in Hazardous Materials Testing must meet the requirements of OSHA and EPA.

B. Inspection and Testing: Testing laboratory to inspect materials and workmanship and perform tests described herein and additional tests requested by SRE/CO. When it appears, materials furnished, or work performed by Contractor fail to meet construction contract requirements, Testing Laboratory must direct attention of SRE/CO to such failure.

C. Written Reports: Testing laboratory to submit test reports to SRE/CO and Contractor within 24 hours after each test is completed unless other arrangements are agreed to in writing by the SRE/CO. Submit reports of tests that fail to meet construction contract requirements on colored paper.

D. Verbal Reports: Give verbal notification to SRE/CO immediately of any irregularity.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EARTHWORK

A. General: The Testing Laboratory is to provide qualified personnel, materials, equipment, and transportation as required to perform the

services identified/required herein, within the agreed to schedule and/or time frame. The work to be performed is as identified herein including, but not be limited to, the following:

1. Observe fill and subgrades during proof-rolling to evaluate suitability of surface material to receive fill or base course. Provide recommendations to the SRE/CO regarding suitability or unsuitability of areas where proof-rolling was observed. Where unsuitable results are observed, witness excavation of unsuitable material and recommend to SRE/CO extent of removal and replacement of unsuitable materials and observe proof-rolling of replaced areas until satisfactory results are obtained.
2. Provide full time observation of fill placement and compaction and field density testing in building areas and provide full time observation of fill placement and compaction and field density testing in pavement areas to verify that earthwork compaction obtained is in accordance with contract documents.
3. Provide supervised geotechnical technician to inspect excavation, subsurface preparation, and backfill for structural fill.

B. Testing Compaction:

1. Determine maximum density and optimum moisture content for each type of fill, backfill and subgrade material used, in compliance with ASTM D698.
2. Make field density tests in accordance with the primary testing method following ASTM D2922 wherever possible. Field density tests utilizing ASTM D1556 or ASTM D2167 to be utilized on a case by case basis only if there are problems with the validity of the results from the primary method due to specific site field conditions. Should the testing laboratory propose these alternative methods, they must provide satisfactory explanation to the SRE/CO before the tests are conducted.
   a. Building Slab Subgrade: At least one test of subgrade for every 2000 square feet of building slab, but in no case fewer than three tests. In each compacted fill layer, perform one test for every 2000 square feet of overlaying building slab, but in no case fewer than three tests.
   b. Foundation Wall Backfill: One test per 100 feet of each layer of compacted fill but in no case fewer than two tests.

c. Pavement Subgrade: One test for each 400 square yards, but in no case fewer than two tests.
d. Curb, Gutter, and Sidewalk: One test for each 300 feet, but in no case fewer than two tests.
e. Trenches: One test at maximum 100-foot intervals per 4 foot of vertical lift and at changes in required density, but in no case fewer than two tests.
f. Footing Subgrade: At least one test for each layer of soil on which footings will be placed. Subsequent verification and approval of each footing subgrade may be based on a visual comparison of each subgrade with related tested subgrade when acceptable to SRE/CO. In each compacted fill layer below wall footings, perform one field density test for every 100 feet of wall. Verify subgrade is level, all loose or disturbed soils have been removed, and correlate actual soil conditions observed with those indicated by test borings.

C. Testing for Footing Bearing Capacity: Evaluate if suitable bearing capacity material is encountered in footing subgrade.
D. Testing Materials: Test suitability of on-site and off-site borrow as directed by SRE/CO.

3.2 LANDSCAPING

A. Test topsoil for organic materials, pH, phosphate, potash content, and gradation of particles.
   1. Test for organic material by using ASTM D2974.
   2. Determine percent of silt, sand, clay, and foreign materials such as rock, roots, and vegetation.
   3. Test for moisture absorption capacity.
B. Submit laboratory test report of topsoil to SRE/CO.
C. Submit recommendations for soil amendments, from a regional soil conservation service or cooperative extension, to bring soil into compliance with minimum parameters in these specifications.

3.3 ASPHALT CONCRETE PAVING

A. Aggregate Base Course:
   1. Determine maximum density and optimum moisture content for aggregate base material in accordance with TxDOT.
   2. Make a minimum of three field density tests on each day's final compaction on each aggregate course.

3. Sample and test aggregate as necessary to insure compliance with specification requirements for gradation, wear, and soundness as specified in the applicable state highway standards and specifications.

B. Asphalt Concrete:

1. Aggregate: Sample and test aggregates in stock pile and hot-bins as necessary to insure compliance with specification requirements for gradation (AASHTO T27), wear (AASHTO T96), and soundness TxDOT.
2. Temperature: Check temperature of each load of asphalt concrete at mixing plant and at site of paving operation.
3. Density: Make a minimum of two field density tests in accordance with ASTM D1188 of asphalt base and surface course for each day's paving operation.

3.4 SITE WORK CONCRETE

A. Test site work concrete including materials for concrete as required in Article CONCRETE of this section.

3.5 CONCRETE

A. Batch Plant Inspection and Materials Testing:

1. Perform continuous batch plant inspection until concrete quality is established to satisfaction of SRE/CO and perform periodic inspections thereafter as determined by SRE/CO.
2. Periodically inspect and test batch proportioning equipment for accuracy and report deficiencies to SRE/CO.
3. Sample and test mix ingredients as necessary to insure compliance with specifications.
4. Sample and test aggregates daily and as necessary for moisture content. Test the dry rodded weight of the coarse aggregate whenever a sieve analysis is made, and when it appears there has been a change in the aggregate.
5. Certify, in duplicate, ingredients and proportions and amounts of ingredients in concrete conform to approved trial mixes. When concrete is batched or mixed off immediate building site, certify (by signing, initialing or stamping thereon) on delivery slips (duplicate) that ingredients in truck-load mixes conform to proportions of aggregate weight, cement factor, and water-cement ratio of approved trial mixes.

B. Field Inspection and Materials Testing:

1. Provide an ACI Certified Field Technician, Grade 1, technician for the entire placement at all times to perform concrete sampling and testing.
2. Review the delivery and batch tickets of the ready-mix concrete trucks arriving on-site. Notify the Contractor if the concrete cannot be placed within the specified time limits or if the type of concrete delivered is incorrect. Reject any loads that do not comply with the Specification requirements. Rejected loads are to be removed from the site at the Contractor’s expense. Any rejected concrete that is placed will be subject to removal.
3. Take concrete samples at point of placement in accordance with ASTM C172. Mold and cure compression test cylinders in accordance with ASTM C31. Make at least three cylinders for each 50 cubic yards or less of each concrete type, and at least three cylinders for any one day's pour for each concrete type. After good concrete quality control has been established and maintained as determined by SRE/CO make three cylinders for each 100 cubic yards or less of each concrete type, and at least three cylinders from any one day's pour for each concrete type. Label each cylinder with an identification number. SRE/CO may require additional cylinders to be molded and cured under job conditions.
4. Perform slump tests in accordance with ASTM C143. Test the first truck each day, and every time test cylinders are made. Test pumped concrete at the hopper and at the discharge end of the hose at the beginning of each day’s pumping operations to determine change in slump.
5. Determine the air content of concrete per ASTM C173. For concrete required to be air-entrained, test the first truck and every 25 cubic yards thereafter each day. For concrete not required to be air-entrained, test every 100 cubic yards at random. For pumped concrete, initially test concrete at both the hopper and the discharge end of the hose to determine change in air content.
6. If slump or air content fall outside specified limits, make another test immediately from another portion of same batch.
7. Perform unit weight tests in compliance with ASTM C138 for normal weight concrete and ASTM C567 for lightweight concrete. Test the first truck and each time cylinders are made.

8. Notify laboratory technician at batch plant of mix irregularities and request materials and proportioning check.
9. Verify that specified mixing has been accomplished.
10. Environmental Conditions: Determine the temperature per ASTM C1064 for each truckload of concrete during hot weather and cold weather concreting operations:
    a. When ambient air temperature falls below 40 degrees F, record maximum and minimum air temperatures in each 24-hour period; record air temperature inside protective enclosure; record minimum temperature of surface of hardened concrete.
    b. When ambient air temperature rises above 85 degrees F, record maximum and minimum air temperature in each 24-hour period; record minimum relative humidity; record maximum wind velocity; record maximum temperature of surface of hardened concrete.
11. Inspect the reinforcing steel placement, including bar size, bar spacing, top and bottom concrete cover, proper tie into the chairs, and grade of steel prior to concrete placement. Submit detailed report of observations.
12. Observe conveying, placement, and consolidation of concrete for conformance to specifications.
13. Observe condition of formed surfaces upon removal of formwork prior to repair of surface defects and observe repair for surface defects.
14. Observe curing procedures for conformance with specifications, record dates of concrete placement, start of preliminary curing, start of final curing, end of curing period.
15. Observe preparations for placement of concrete:
    a. Inspect handling, conveying, and placing equipment, inspect vibrating and compaction equipment.
    b. Inspect preparation of construction, expansion, and isolation joints.
16. Observe preparations for protection from hot weather, cold weather, sun, and rain, and preparations for curing.
17. Observe concrete mixing:
    a. Monitor and record amount of water added at project site.
    b. Observe minimum and maximum mixing times.
18. Measure concrete flatwork for levelness and flatness as follows:

a. Perform Floor Tolerance Measurements F_F and F_L in accordance with ASTM E1155. Calculate the actual overall F- numbers using the inferior/superior area method.
b. Perform all floor tolerance measurements within 48 hours after slab installation and prior to removal of shoring and formwork.
c. Provide the Contractor and the SRE/CO with the results of all profile tests, including a running tabulation of the overall F_F and F_L values for all slabs installed to date, within 72 hours after each slab installation.

19. Other inspections:
    a. Grouting under base plates.
    b. Grouting anchor bolts and reinforcing steel in hardened concrete.

C. Laboratory Tests of Field Samples:
1. Test compression test cylinders for strength in accordance with ASTM C39. For each test series, test one cylinder at 7 days and one cylinder at 28 days. Use remaining cylinder as a spare tested as directed by SRE/CO. Compile laboratory test reports as follows: Compressive strength test to be the result of one cylinder, except when one cylinder shows evidence of improper sampling, molding or testing, in which case it must be discarded and strength of spare cylinder to be used.
2. Make weight tests of hardened lightweight structural concrete in accordance with ASTM C567.
3. Furnish certified compression test reports (duplicate) to SRE/CO. In test report, indicate the following information:
    a. Cylinder identification number and date cast.
    b. Specific location at which test samples were taken.
    c. Type of concrete, slump, and percent air.
    d. Compressive strength of concrete in psi.
    e. Weight of lightweight structural concrete in pounds per cubic feet.
    f. Weather conditions during placing.
    g. Temperature of concrete in each test cylinder when test cylinder was molded.
    h. Maximum and minimum ambient temperature during placing.
    i. Ambient temperature when concrete sample in test cylinder was taken.

j. Date delivered to laboratory and date tested.

3.6 REINFORCEMENT

A. Review mill test reports furnished by Contractor.

B. Make one tensile and one bend test in accordance with ASTM A370 from each pair of samples obtained.

C. Written report must include, in addition to test results, heat number, manufacturer, type and grade of steel, and bar size.

D. Perform tension tests of mechanical and welded splices in accordance with ASTM A370.

3.7 PRESTRESSED CONCRETE

A. Inspection at Plant: Forms, placement and concrete cover of reinforcing steel and tendons, placement and finishing of concrete, and tensioning of tendons.

B. Concrete Testing: Test concrete including materials for concrete required in Article, CONCRETE of this section, except make two test cylinders for each day's production of each strength of concrete produced.

C. Test tendons for conformance with ASTM A416 and furnish report to SRE/CO.

D. Inspect members to ensure that specification requirements for curing and finishes have been met.

3.8 ARCHITECTURAL CAST STONE

A. Perform testing according to ASTM C1364 or verify compliance by reviewing previous test results of same product.

B. Inspect the plant to verify that specification requirements for curing and finishes have been met.

3.9 MASONRY

A. Mortar Tests:

1. Laboratory compressive strength test:

a. Comply with ASTM C780.

b. Obtain samples during or immediately after discharge from batch mixer.

c. Furnish molds with 2-inch, 3 compartment gang cube.

d. Test one sample at 7 days and 2 samples at 28 days.

2. Two tests during first week of operation; one test per week after initial test until masonry completion.

B. Grout Tests:

1. Laboratory compressive strength test:
   a. Comply with ASTM C1019.
   b. Test one sample at 7 days and 2 samples at 28 days.
   c. Perform test for each 2500 square feet of masonry.

C. Masonry Unit Tests:
1. Laboratory Compressive Strength Test:
   a. Comply with ASTM C140.
   b. Test 3 samples for each 5000 square feet of wall area.

D. Prism Tests: For each type of wall construction indicated, test masonry prisms per ASTM C1314 for each 5000 square feet of wall area. Prepare one set of prisms for testing at 7 days and one set for testing at 28 days.

E. Field Inspection and Materials Testing:
1. Verify the following prior to grouting:
   a. Grout space is clean.
   b. Type, spacing, and placement of reinforcement, connectors, and anchors comply with the contract requirements.

3.10 STRUCTURAL STEEL

A. See Structural Drawings for Structural Steel testing and inspection table.

B. Submit inspection reports, record of welders and their certification, and identification, and instances of noncompliance to SRE/CO.

3.11 STEEL DECKING (NOT USED)

3.12 SHEAR CONNECTOR STUDS (NOT USED)

3.13 TYPE OF TEST

A. Landscaping: Topsoil Test as specified in Section 32 90 00 PLANTING.

3.14 ADDITIONAL TESTING

A. SRE/CO may request additional testing at any time at no additional cost to the Government.

- - - E N D - - -

SECTION 01 57 19
TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.1 DESCRIPTION

A. This section specifies the control of environmental pollution and damage that the Contractor must consider for air, water, and land resources. It includes management of visual aesthetics, noise, and solid waste, as well as other pollutants and resources encountered or generated by the Contractor. The Contractor is obligated to consider specified control measures with the costs included within the various contract items of work.

B. Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which:

1. Adversely affect human health or welfare.
2. Unfavorably alter ecological balances of importance to human life.
3. Affect other species of importance to humankind.
4. Degrade the utility of the environment for aesthetic, cultural, and historical purposes.

1.2 DEFINITIONS OF POLLUTANTS

A. Chemical Waste: Petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.

B. Debris: Combustible and noncombustible wastes, such as leaves, tree trimmings, ashes, and waste materials resulting from construction or maintenance and repair work.

C. Sediment: Soil and other debris that has been eroded and transported by runoff water.

D. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from project construction activities.

E. Surface Discharge: The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "waters of the United States" and require a permit to discharge water from the governing agency.

F. Rubbish: Combustible and noncombustible wastes such as, but not limited to, paper, plastic, metal and plastic containers and cans, boxes, metal and lumber scrap.

G. Sanitary Wastes: Domestic Sanitary Sewage.

1.3 QUALITY CONTROL

A. Establish and maintain quality control for the environmental protection of all items set forth herein.

B. Record on daily reports any problems in complying with laws, regulations, ordinances and note any corrective action taken.

1.4 REFERENCES

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

B. U.S. National Archives and Records Administration (NARA):
33 CFR 328 - Definition of Waters of the United States.

C. Federal Environmental Regulatory Requirements: Comply with applicable regulations. The following is for Contractor's information only:

1. Storm water permits; refer to The Office of Wastewater Management, NPDES Storm Water Program: http://www.epa.gov/npdes/stormwater
2. RCRA hazardous and non-hazardous solid waste requirements; refer to EPA's Office of Land and Emergency Management: https://www.epa.gov/aboutepa/about-office-land-and-emergency-management
3. Oil spill requirements for construction activities; refer to EPA Oil Program web site: http://www.epa.gov/oilspill/
4. Hazardous substances (Superfund Liability) requirements for construction activities; refer to EPA's Superfund website: https://www.epa.gov/superfund
6. Polychlorinated Biphenyl (PCB) waste requirements; refer to EPA's Polychlorinated Biphenyl (PCB) Homepage: http://www.epa.gov/pcb/
7. Air quality requirements for construction activities; refer to EPA'S Air Program Mobile Sources Page: https://www.epa.gov/compliance/mobile-sources-compliance-monitoring-program
8. Asbestos requirements for construction activities; refer to EPA's Asbestos Management and Regulatory Requirements Website: https://www.epa.gov/asbestos/asbestos-laws-and-regulations
9. National Environmental Policy Act (NEPA) requirements for construction activities: https://www.epa.gov/nepa

10. Endangered Species Act; refer to The US Fish and Wildlife Service Endangered Species Program: http://endangered.fws.gov/

C. State and Local Environmental Regulatory Requirements: Comply with applicable regulations. The following is for Contractor's information only:

1. State Office/Department of Environmental Quality: https://www.tceq.texas.gov/
2. Local Office/Department of Environmental Quality: https://www.sanantonio.gov/PublicWorks/Services/Environmental-Management
3. The Construction Industry Compliance Assistance Center: http://www.cicacenter.org/index.cfm
4. The National Environmental Compliance Assistance: https://www.epa.gov/compliance/compliance-assistance-centers

1.5 SUSTAINABILITY REQUIREMENTS (NOT USED)

1.6 SUBMITTALS

A. In accordance with Section, 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, the Contractor will furnish the following:

1. Environmental Protection Plan: After the contract is awarded, and prior to the commencement of the work, meet with the Senior Resident Engineer or Contracting Officer (SRE/CO) to discuss the proposed Environmental Protection Plan and to develop mutual understanding relative to details of environmental protection. Not more than 20 days after the meeting, prepare and submit to the SRE/CO for approval, a written and/or graphic Environmental Protection Plan including, but not limited to, the following:
   a. Name(s) and qualifications of person(s) within the Contractor's organization who is (are) responsible for:
      1) Ensuring adherence to the Environmental Protection Plan.
      2) Manifesting hazardous waste to be removed from the site.
      3) Training the Contractor's environmental protection personnel.
   b. Description of the Contractor's environmental protection personnel training program.
   c. A list of Federal, State, and local laws, regulations, and permits concerning environmental protection, pollution control, noise control and abatement that are applicable to the

Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits.

d. Methods for protection of features to be preserved within authorized work areas including trees, shrubs, vines, grasses, ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, and archeological and cultural resources.

e. Procedures to provide environmental protection that complies with applicable laws and regulations. Describe the procedures to correct pollution of the environment due to accident, natural causes, or failure to follow the procedures as described in the Environmental Protection Plan.

f. Permits, licenses, and the location of the solid waste disposal area.

g. Drawings showing locations of any proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials. Include as part of an Erosion Control Plan approved and/or mandated state agency, and the Department of Veterans Affairs.

h. Environmental Monitoring Plans for the job site including land, water, air, and noise.

i. Work Area Plan showing the proposed activity in each portion of the area and identifying the areas of construction limits or protected areas. Plan should include measures for marking the limits of use areas. This plan may be incorporated within the Erosion Control Plan.

B. Within 20 days after the date of its submittal, the SRE/CO will approve the Contractor’s Comprehensive Environmental Protection Plan or respond with an explanation for its rejection and resubmittal.

C. Approval of the Contractor's Environmental Protection Plan will not relieve the Contractor of responsibility for adequate and continued control of pollutants and other environmental protection measures.

1.7 PROTECTION OF ENVIRONMENTAL RESOURCES

A. Protect environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire period of this contract and after the project is complete, based upon leaving

the site that has yet to mature of hydroseeding. Confine construction activities to areas defined by construction limits, the specifications and drawings.

B. Protection of Land Resources: Prior to construction, identify all land resources to be preserved within the work area. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, landforms, wetlands, or wetland buffers without prior approval from the SRE/CO. Do not fasten or attach ropes, cables, or guys to trees for anchorage unless specifically authorized, or dictated by special emergency use.

1. Work Area Limits: Prior to any construction, mark/fence/protect the areas that require work to be performed under this contract. Prior to construction, mark/fence/protect monuments, works of art, and any other markers to remain. Convey to all personnel the purpose of marking and protecting all marked and protected objects.
2. Protection of Specific Regulated Elements: Wetlands and wetland buffers and other landscape features shown on the drawings to be preserved by marking, fencing, or using any other approved protective techniques.
   a. Protect trees and shrubs to remain on site to protect from damage per contract details.
   b. All damage to existing trees and shrubs will be immediately repaired by trimming, cleaning, and painting with antiseptic tree paint.
   c. Do not store building materials or perform construction activities closer to existing trees or shrubs than the farthest extension of their limbs.
3. Reduction of Exposure of Unprotected Erodible Soils: Plan and conduct earthwork to minimize the duration of exposure of unprotected soils. Clear areas only as needed to use to work the area to be developed. Form earthwork to final grade as shown as quickly as possible to minimize potential erosion damage. Immediately protect side slopes and back slopes upon completion of rough grading or clearing with appropriate material as defined in the Sediment and Erosion Control Plan.
4. Temporary Protection of Disturbed Areas: Construct diversion ditches, benches, check dams and berms to retard and divert runoff

from the construction site to protected drainage areas as intended under paragraph 208 of the Clean Water Act.

a. Sediment Basins: Trap sediment from construction areas in temporary or permanent sediment basins that accommodate the runoff of a local 2-year storm. After each storm, pump the basins dry and remove the accumulated sediment. Control overflow/drainage with paved weirs or by vertical overflow pipes, that drain from the surface of the basin.

b. Reuse or conserve the collected topsoil sediment as directed by the SRE/CO. Topsoil use and requirements are specified in Section 31 20 11, EARTH MOVING.

c. Institute effluent quality monitoring programs as required by Federal, State, and local environmental agencies.

5. Erosion and Sedimentation Control Devices: Construct or install all temporary and permanent erosion and sedimentation control features shown on the Storm Water Pollution Plan to avoid violating water quality in accordance with federal and state regulations. Maintain temporary erosion and sediment control measures such as berms, dikes, drains, sedimentation basins, grassing, and mulching, straw waddles, fiber rolls, until permanent drainage and erosion control facilities are completed and operative.

6. Manage and control borrow and spoil areas on Government property to minimize erosion and to prevent soil and/or sediment from entering nearby water courses or lakes.

7. Protect adjacent areas from despoilment by temporary excavations and embankments.

8. Handle and dispose of solid wastes in such a manner that will prevent contamination of the environment. Place solid wastes (excluding clearing debris) in containers that are emptied on a regular schedule. Transport all solid waste off Government property and dispose of waste in compliance with Federal, State, and local requirements.

9. Store chemical waste away from the work areas in corrosion resistant containers and dispose of waste in accordance with Federal, State, and local regulations.

10. Handle discarded materials other than those included in the solid waste category as directed by the SRE/CO.

C. Protection of Water Resources: Keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters and sewer systems. Implement management techniques to control water pollution by the listed construction activities that are included in this contract.
   1. Washing and Curing Water: Do not allow wastewater directly derived from construction activities to enter water areas. Collect and place wastewater in sediment basins prior to entering retention/detention ponds, allowing the suspended material to settle, the pollutants to separate, or the water to evaporate.
   2. Monitor water areas, wetlands and wetland buffers affected by construction.

D. Protection of Fish and Wildlife Resources: Keep construction activities under surveillance, management, and control to minimize interference with, disturbance of, or damage to fish and wildlife. Prior to beginning construction operations, list protected species that require specific attention along with measures for their protection.

E. Protection of Air Resources: Keep construction activities under surveillance, management, and control to minimize pollution of air resources. Burning is not permitted on the job site. Keep activities, equipment, processes, and work operated or performed, in strict accordance with the State of Texas Clean Air Act, by the Texas Commission on Environmental Quality, and Federal emission and performance laws and standards. Maintain ambient air quality standards set by the Environmental Protection Agency, for those construction operations and activities specified.
   1. Particulates: Control dust particles, aerosols, and gaseous by-products from all construction activities, processing, and preparation of materials at all times, including weekends, holidays, and hours when work is not in progress.
   2. Particulates Control: Maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, spoil areas, borrow areas, and all other work areas within or outside the project boundaries free from particulates which would cause a hazard or a nuisance. Sprinklering, chemical treatment of an approved type, light bituminous treatment, or other methods are permitted to

control particulates in the work area as approved in the Environmental Protection Plan.

3. Hydrocarbons and Carbon Monoxide: Control monoxide emissions from equipment to Federal and State allowable limits.
4. Odors: Control odors of construction activities and prevent obnoxious odors from occurring.

F. Noise Control: Minimize noise using every action possible. Perform noise-producing work in less sensitive hours of the day or week as directed by the Resident Engineer/COR. Maintain noise-produced work at or below the decibel levels and within the time periods specified.

1. Perform construction activities involving repetitive, high-level impact noise only between 7:00 a.m. and 7:00p.m unless otherwise permitted by local ordinance or the SRE/CO. Repetitive impact noise on the property will not exceed the following Decibel A-scale (dBA) limitations:

Time Duration of Impact Noise	Sound Level in dBA
More than 12 minutes in any hour	70
Less than 30 seconds of any hour	85
Less than three minutes of any hour	80
Less than 12 minutes of any hour	75

2. Provide sound-deadening devices on equipment and take noise-abatement measures that are necessary to comply with the requirements of this contract, consisting of, but not limited to, the following:
   a. Maintain maximum permissible construction equipment noise levels as measured with an A-scale decibel measuring device at 15 m (50 feet) (dBA):

CATEGORY OF EQUIPMENT			
EARTHMOVING		MATERIALS HANDLING	
EQUIPMENT STYLE	SOUND LEVEL dBA	EQUIPMENT STYLE	SOUND LEVEL dBA
FRONT LOADERS	75	CONCRETE MIXERS	75
BACKHOES	75	CONCRETE PUMPS	75
DOZERS	75	CRANES	75
TRACTORS	75	DERRICKS IMPACT	75
SCAPERS	80	PILE DRIVERS	95

GRADERS	75	JACK HAMMERS	75
TRUCKS	75	ROCK DRILLS	80
PAVERS, STATIONARY	80	PNEUMATIC TOOLS	80
PUMPS	75		
GENERATORS	75	SAWS	75
COMPRESSORS	75	VIBRATORS	75

b. Provide soundproof housings or enclosures for noise-producing machinery.

c. Use efficient silencers on equipment air intakes.

d. Use efficient intake and exhaust mufflers on internal combustion engines that are maintained so equipment performs below noise levels specified.

e. Line hoppers and storage bins with sound deadening material.

f. Conduct truck loading, unloading, and hauling operations so that noise is kept to a minimum.

3. Measure sound level for noise exposure due to the construction at least once every five successive working days while work is being performed above 75 dB(A) noise level. Measure noise exposure at the property line or 15 m (50 feet) from the noise source, whichever is greater. Measure the sound levels on the A weighted sound level of a General Purpose sound level meter at slow response. To minimize the effect of reflective sound waves at buildings, take measurements at 900 to 1800 mm (three to six feet) in front of any building face. Submit the recorded information to the Resident Engineer/COR noting any problems and the alternatives for mitigating actions.

G. Restoration of Damaged Property: If any direct or indirect damage is done to public or private property resulting from any act, omission, neglect, or misconduct, the Contractor will restore the damaged property to a condition equal to that existing before the damage at no additional cost to the Government. Repair, rebuild, or restore property as directed or make good such damage in an acceptable manner.

H. Final Clean-up: On completion of project and after removal of all debris, rubbish, and temporary construction, Contractor will leave the construction area in a clean condition as approved by the SRE/CO. The site will be left meeting the requirements of the local and state environmental requirements associated with the (SWPPP) Storm Water

Pollution Protection Plan as submitted. Cleaning will include off-cemetery disposal of all items and materials not required to be salvaged, as well as all debris and rubbish resulting from demolition and new work operations, clearing, logging and general construction in accordance with state and local regulations and the contract.

- - - E N D - - -

SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section specifies the requirements for the management of non-hazardous building construction and demolition waste.

B. Waste disposal in landfills will be minimized to the greatest extent possible. Of the inevitable waste that is generated, as much of the waste material as economically feasible will be salvaged, recycled or reused.

C. Contractor will use all reasonable means to divert construction and demolition waste from landfills and incinerators, and facilitate their salvage and recycle not limited to the following:

1. Waste Management Plan development and implementation.
2. Techniques to minimize waste generation.
3. Sorting and separating of waste materials.
4. Salvage of existing materials and items for reuse or resale.
5. Recycling of materials that cannot be reused or sold.

D. At a minimum the following waste categories will be diverted from landfills:

1. Soil.
2. Inerts (eg, concrete, masonry and asphalt).
3. Clean dimensional wood and palette wood.
4. Green waste (biodegradable landscaping materials).
5. Engineered wood products (plywood, particle board and I-joists, etc).
6. Metal products (eg, steel, wire, beverage containers, etc).
7. Cardboard, paper and packaging.
8. Bitumen roofing materials.
9. Plastics (eg, ABS, PVC).
10. Carpet and/or pad.
11. Gypsum board.
12. Insulation.
13. Paint.

1.2 RELATED WORK

A. Section 02 41 00, DEMOLITION.

B. Section 01 00 00, GENERAL REQUIREMENTS.

C. Lead Paint: Section 02 83 33.13, LEAD BASED PAINT REMOVAL AND DISPOSAL.

1.3 QUALITY ASSURANCE

A. Contractor will practice efficient waste management when sizing, cutting and installing building products. Processes will be employed to ensure the generation of as little waste as possible. Construction /Demolition waste includes products of the following:
   1. Excess or unusable construction materials.
   2. Packaging used for construction products.
   3. Poor planning and/or layout.
   4. Construction error.
   5. Over ordering.
   6. Weather damage.
   7. Contamination.
   8. Mishandling.
   9. Breakage.

B. Establish and maintain the management of non-hazardous building construction and demolition waste set forth herein. Conduct a site assessment to estimate the types of materials that will be generated by demolition and construction.

C. Contractor will develop and implement procedures to reuse and recycle new materials to a minimum of 50 percent.

D. Contractor will be responsible for implementation of any special programs involving rebates or similar incentives related to recycling. Any revenues or savings obtained from salvage or recycling will accrue to the contractor.

E. Contractor will provide all demolition, removal and legal disposal of materials. Contractor will ensure that facilities used for recycling, reuse and disposal will be permitted for the intended use to the extent required by local, state, federal regulations. The Whole Building Design Guide website http://www.wbdg.org/tools/cwm.php provides a Construction Waste Management Database that contains information on companies that haul. Collect, and process recyclable debris from construction projects.

F. Contractor will assign a specific area to facilitate separation of materials for reuse, salvage, recycling, and return. Such areas are to be kept neat and clean and clearly marked in order to avoid contamination or mixing of materials.

G. Contractor will provide on-site instructions and supervision of separation, handling, salvaging, recycling, reuse and return methods to be used by all parties during waste generating stages.
H. Record on daily reports any problems in complying with laws, regulations and ordinances with corrective action taken.

1.4 TERMINOLOGY

A. Class III Landfill: A landfill that accepts non-hazardous resources such as household, commercial and industrial waste resulting from construction, remodeling, repair and demolition operations.
B. Clean: Untreated and unpainted; uncontaminated with adhesives, oils, solvents, mastics and like products.
C. Construction and Demolition Waste: Includes all non-hazardous resources resulting from construction, remodeling, alterations, repair and demolition operations.
D. Dismantle: The process of parting out a building in such a way as to preserve the usefulness of its materials and components.
E. Disposal: Acceptance of solid wastes at a legally operating facility for the purpose of land filling (includes Class III landfills and inert fills).
F. Inert Backfill Site: A location, other than inert fill or other disposal facility, to which inert materials are taken for the purpose of filling an excavation, shoring or other soil engineering operation.
G. Inert Fill: A facility that can legally accept inert waste, such as asphalt and concrete exclusively for the purpose of disposal.
H. Inert Solids/Inert Waste: Non-liquid solid resources including, but not limited to, soil and concrete that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional water board, and does not contain significant quantities of decomposable solid resources.
I. Mixed Debris: Loads that include commingled recyclable and non-recyclable materials generated at the construction site.
J. Mixed Debris Recycling Facility: A solid resource processing facility that accepts loads of mixed construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing non-recyclable materials.

K. Permitted Waste Hauler: A company that holds a valid permit to collect and transport solid wastes from individuals or businesses for the purpose of recycling or disposal.

L. Recycling: The process of sorting, cleansing, treating, and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.

1. On-site Recycling – Materials that are sorted and processed on site for use in an altered state in the work, i.e. concrete crushed for use as a sub-base in paving.
2. Off-site Recycling – Materials hauled to a location and used in an altered form in the manufacture of new products.

M. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the manufacture of new products. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a solid waste facilities permit or be regulated by the local enforcement agency.

N. Reuse: Materials that are recovered for use in the same form, on-site or off-site.

O. Return: To give back reusable items or unused products to vendors for credit.

P. Salvage: To remove waste materials from the site for resale or re-use by a third party.

Q. Source-Separated Materials: Materials that are sorted by type at the site for the purpose of reuse and recycling.

R. Solid Waste: Materials that have been designated as non-recyclable and are discarded for the purposes of disposal.

S. Transfer Station: A facility that can legally accept solid waste for the purpose of temporarily storing the materials for re-loading onto other trucks and transporting them to a landfill for disposal, or recovering some materials for re-use or recycling.

1.5 SUBMITTALS

A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES, furnish the following:

B. Prepare and submit to the Resident Engineer a written demolition debris management plan. The plan will include, but not be limited to, the following information:
   1. Procedures to be used for debris management.
   2. Techniques to be used to minimize waste generation.
   3. Analysis of the estimated job site waste to be generated:
      a. List of each material and quantity to be salvaged, reused, recycled.
      b. List of each material and quantity proposed to be taken to a landfill.
   4. Detailed description of the Means/Methods to be used for material handling.
      a. On site: Material separation, storage, protection where applicable.
      b. Off site: Transportation means and destination. Include list of materials.
         1) Description of materials to be site-separated and self-hauled to designated facilities.
         2) Description of mixed materials to be collected by designated waste haulers and removed from the site.
      c. The names and locations of mixed debris reuse and recycling facilities or sites.
      d. The names and locations of trash disposal landfill facilities or sites.
      e. Documentation that the facilities or sites are approved to receive the materials.

B. Designated Manager responsible for instructing personnel, supervising, documenting and administer over meetings relevant to the Waste Management Plan.

C. Monthly summary of construction and demolition debris diversion and disposal, quantifying all materials generated at the work site and disposed of or diverted from disposal through recycling.

1.6 APPLICABLE PUBLICATIONS

Publications listed below form a part of this specification to the extent referenced. Publications are referenced by the basic designation only. In the event that criteria requirements conflict, the most stringent requirements will be met.

A. U.S. Green Building Council (USGBC):
LEED Green Building Rating System for New Construction

1.7 RECORDS

Maintain records to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Records will be kept in accordance with the LEED Reference Guide and LEED Template.

PART 2 - PRODUCTS

2.1 MATERIALS

A. List of each material and quantity to be salvaged, recycled, reused.
B. List of each material and quantity proposed to be taken to a landfill.
C. Material tracking data: Receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices, net total costs or savings.

PART 3 - EXECUTION

3.1 COLLECTION

A. Provide all necessary containers, bins and storage areas to facilitate effective waste management.
B. Clearly identify containers, bins and storage areas so that recyclable materials are separated from trash and can be transported to respective recycling facility for processing.
C. Hazardous wastes will be separated, stored, disposed of according to local, state, and federal regulations.

3.2 DISPOSAL

A. Contractor will be responsible for transporting and disposing of materials that cannot be delivered to a source-separated or mixed materials recycling facility to a transfer station or disposal facility that can accept the materials in accordance with state and federal regulations.
B. Construction or demolition materials with no practical reuse or that cannot be salvaged or recycled will be disposed of at a landfill or incinerator.

3.3 REPORT

A. With each application for progress payment, submit a summary of construction and demolition debris diversion and disposal including beginning and ending dates of period covered.

B. Quantify all materials diverted from landfill disposal through salvage or recycling during the period with the receiving parties, dates removed, transportation costs, weight tickets, manifests, invoices. Include the net total costs or savings for each salvaged or recycled material.

C. Quantify all materials disposed of during the period with the receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices. Include the net total costs for each disposal.

- - - E N D - - -

SECTION 02 41 10
DEMOLITION AND SITE CLEARING

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies all site preparation work, demolition and removal of portions of buildings, utilities, other structures and debris from trash dumps shown.

1.2 RELATED WORK

A. Demolition and removal of roads, walks, curbs, and on-grade slabs outside buildings to be demolished: Section 31 20 00, EARTH MOVING Section 31 20 11.

B. Safety Requirements: GENERAL CONDITIONS Article, ACCIDENT PREVENTION.

C. Disconnecting utility services prior to demolition: Section 01 00 00, GENERAL REQUIREMENTS.

D. Reserved items that are to remain the property of the Government: Section 01 00 00, GENERAL REQUIREMENTS.

E. Lead Paint: Section 02 83 33.13, LEAD-BASED PAINT REMOVAL AND DISPOSAL.

F. Environmental Protection: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

G. Waste Management: Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT

1.3 PROTECTION

A. Perform demolition in such manner as to eliminate hazards to persons and property; to minimize interference with use of adjacent areas, utilities and structures or interruption of use of such utilities; and to provide free passage to and from such adjacent areas of structures. Comply with requirements of GENERAL CONDITIONS Article, ACCIDENT PREVENTION.

B. Provide safeguards, including warning signs, barricades, temporary fences, warning lights, and other similar items that are required for protection of all personnel during demolition and removal operations. Comply with requirements of Section 01 00 00, GENERAL REQUIREMENTS, Article 1.9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES AND IMPROVEMENTS.

C. Maintain fences, barricades, lights, and other similar items around exposed excavations until such excavations have been completely filled

D. Prevent spread of flying particles and dust. Sprinkle rubbish and debris with water to keep dust to a minimum. Do not use water if it

results in hazardous or objectionable condition such as, but not limited to; ice, flooding, or pollution. Vacuum and dust the work area daily.

E. In addition to previously listed fire and safety rules to be observed in performance of work, include following:
   1. No wall or part of wall will be permitted to fall outwardly from structures.
   3. Wherever a cutting torch or other equipment that might cause a fire is used, provide and maintain fire extinguishers nearby ready for immediate use. Instruct all possible users in use of fire extinguishers.
   4. Keep hydrants clear and accessible at all times. Prohibit debris from accumulating within a radius of 4500 mm (15 feet) of fire hydrants.

F. Before beginning any demolition work, survey the site and examine the drawings and specifications to determine the extent of the work. Take necessary precautions to avoid damages to existing items to remain in place, to be reused, or to remain the property of the Cemetery; any damaged items will be repaired or replaced as approved by the Resident Engineer/Contracting Officer's Representative (RE/COR). Coordinate the work of this section with all other work. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded. Increase structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract. Provide new supports and reinforcement for existing construction weakened by demolition or removal works. Repairs, reinforcement, or structural replacement must have RE/COR's approval.

G. The work will comply with the requirements of Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

H. Perform demolition such that it is timed to avoid nesting periods of migratory birds on site and protected under the Migratory Bird Treaty Act.

1.4 UTILITY SERVICES

A. Demolish and remove outside utility service lines shown to be removed.

B. Remove abandoned outside utility lines that would interfere with installation of new utility lines and new construction.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SITE CLEARING

A. General: Remove trees, shrubs, grass, and other vegetation, pavements, improvements, or obstructions, as required, to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. Removal includes digging out and off-site disposal of stumps and roots.

1. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.

B. Erosion Control: Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways. Install silt fence and inlet protection as shown and as per requirements of the SWPPP, prior to any soil disturbance activities. Provide temporary seeding as required by the SWPPP.

C. Maintain site controls in accordance with Storm Water Pollution Prevention Plan and repair as directed by COTR to sustain compliance with SPDES permit. Maintain all records as required by the SWPPP. Perform inspections as required by the SWPPP.

D. Topsoil - On-site: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 150 mm (6 inches). Satisfactory topsoil is reasonably free and/or screened of subsoil, clay lumps, stones, and other objects over 25 mm (1 inch) in diameter, and without weeds, roots, and other objectionable material.

1. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping.

   a. Where existing trees are indicated to remain, leave existing topsoil in place within drip lines to prevent damage to root system.

2. Stockpile topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles to prevent wind erosion in accordance with the Storm Water Pollution Prevention Plan. Refer to Division 32 Section

32 90 00, "Planting" for soil amendments required prior to spreading topsoil.

a. Stockpile will be contained with erosion and sediment controls (silt fence) and stabilized if undisturbed in accordance with the Storm Water Pollution Prevention Plan.

3. Dispose of unsuitable or excess topsoil as specified for disposal of waste material only after approval of the Architect.

E. Clearing and Grubbing: Clear site of trees, shrubs, and other vegetation, except for those indicated to be left standing.

1. Completely remove stumps, roots, and other debris protruding through ground surface.
2. Use only hand methods for grubbing inside drip line of trees indicated to remain.
3. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.

a. Place fill material in horizontal layers not exceeding 150 mm (6 inches) loose depth, and thoroughly compact each layer to a density equal to adjacent original ground.

F. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.

G. Abandonment or removal of certain underground pipe or conduits may be indicated on mechanical or electrical drawings and is included under work of related Division 23 and 26 Sections. Removing abandoned underground piping or conduits interfering with construction is included under this Section, except as indicated to be abandoned in-place.

H. Continue maintenance of erosion controls in compliance with the Storm Water Pollution Prevention Plan until the work is completed and the threat of erosion is gone by either around surface stabilizer or lawn "grow-in" is at 85% complete. Temporary erosion control devices will not be removed until the area is certified as being stabilized by the Qualified Inspector.

3.2 DEMOLITION

A. Selectively demolish and remove portions of buildings and structures, including all appurtenances related or connected thereto, as noted below:

1. As required for installation of new utility service lines.
2. To full depth within an area defined by hypothetical lines located 1500 mm (5 feet) outside building lines of new structures.
3. Demolish and remove existing building construction only to the extent required for new construction and as indicated, so that portions of the building to remain will be undamaged. Protect construction indicated to remain against damage and soiling during selective demolition. Neatly cut openings plumb square and true to dimensions required. Use cutting methods least likely to damage construction to remain.
4. If removal of existing work exposes unfinished surfaces or work out of alignment, such surfaces will be modified or replaced as necessary to make contiguous work uniform and harmonious.
5. Infill masonry will be toothed in.

B. Debris, including brick, concrete, stone, metals and similar materials will become property of Contractor and will be disposed of by him daily, off the Cemetery Property to avoid accumulation at the demolition site. Materials that cannot be removed daily will be stored in areas specified by the RE/COR. Break up concrete slabs below grade that do not require removal from present location into pieces not exceeding 600 mm (24 inches) square to permit drainage. Contractor will dispose debris in compliance with applicable federal, state or local permits, rules and/or regulations

C. Remove and legally dispose of all materials, other than earth to remain as part of project work, from any trash dumps shown. Materials removed will become property of contractor and will be disposed of in compliance with applicable federal, state or local permits, rules and/or regulations. All materials in the indicated trash dump areas, including above surrounding grade and extending to a depth of 1500 mm (5 feet) below surrounding grade, will be included as part of the lump sum compensation for the work of this section. Materials that are located beneath the surface of the surrounding ground more than 1500 mm (5 feet), or materials that are discovered to be hazardous, will be

handled as unforeseen. The removal of hazardous material will be referred to Hazardous Materials specifications. Burning is not permitted on the property.

D. Remove existing utilities as indicated or uncovered by work and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the RE/COR. When Utility lines are encountered that are not indicated on the drawings, the RE/COR will be notified prior to further work in that area.

3.2 CLEAN-UP

A. On completion of work of this section and after removal of all debris, leave site in clean condition satisfactory to RE/COR. Clean-up will include off the Cemetery Property disposal of all items and materials not required to remain property of the Government as well as all debris and rubbish resulting from demolition operations.

- - - E N D - - -

SECTION 03 30 53
(SHORT-FORM) CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies cast-in-place structural concrete and material and mixes for other concrete.

1.2 RELATED WORK

A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.

B. Concrete roads, walks, and similar exterior site work: Section 32 05 23, CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS.

C. Joint Sealants: Section 07 92 00 JOINT SEALANTS

D. Finishes: Section 09 06 00 SCHEDULE OF FINISHES

1.3 TOLERANCES

A. ACI 117.

B. Slab Finishes: ACI 117, F-number method in accordance with ASTM E1155.

1.4 REGULATORY REQUIREMENTS

A. ACI SP-66 - ACI Detailing Manual.

B. ACI 318 - Building Code Requirements for Reinforced Concrete.

1.5 SUSTAINABILITY REQUIREMENTS (NOT USED)

1.6 REGULATORY REQUIREMENTS FOR RECYCLED CONTENT

A. Products and Materials with Post-Consumer Content and Recovered Materials Content:

1. Contractor is obligated by contract to satisfy Federal mandates for procurement of products and materials meeting recommendations for post-consumer content and recovered materials content; the list of designated product categories with recommendations has been compiled by the EPA - refer to http://www.epa.gov/wastes/conserve/tools/cpg/products/.
2. Materials or products specified by this section may be obligated to satisfy this Federal mandate and Comprehensive Procurement Guidelines program.
3. The EPA website also provides tools such as a Product Supplier Directory search engine and product resource guides.

1.7 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Concrete Mix Design.

C. Shop Drawings:

1. Submit Steel Reinforcement Shop Drawings and Product Data to include all information necessary for fabrication and placement of reinforcement.
2. Indicate grades of reinforcing steel.
3. Clearly indicate the splice length for every size and type of bar used.
4. Indicate the type, size and location of all accessories required for the proper assembly, placement and support of the reinforcement.
5. Provide layout drawings of all floor slabs and formed concrete indicating control and expansion joints.

D. Manufacturer's Certificates: Air-entraining admixture, chemical admixtures, curing compounds.

1.8 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

B. American Concrete Institute (ACI):

117-10	Tolerances for Concrete Construction and Materials and Commentary
211.1-91(R2009)	Selecting Proportions for Normal, Heavyweight, and Mass Concrete
301-10	Structural Concrete
305R-10	Guide to Hot Weather Concreting
306R-10	Guide to Cold Weather Concreting
SP-66-04	ACI Detailing Manual
318/318M-11	Building Code Requirements for Structural Concrete and Commentary
347R-04	Guide to Formwork for Concrete

C. American Society for Testing and Materials (ASTM):

A185/A185M-07	Steel Welded Wire Reinforcement, Plain, for Concrete
A615/A615M-12	Deformed and Plain Carbon Steel Bars for Concrete Reinforcement

A996/A996M-09b	Rail Steel and Axle Steel Deformed Bars for Concrete Reinforcement
C31/C31M-12	Making and Curing Concrete Test Specimens in the Field
C33/C33M-13	Concrete Aggregates
C39/C39M-12a	Compressive Strength of Cylindrical Concrete Specimens
C94/C94M-13	Ready Mixed Concrete
C143/C143M-12	Slump of Hydraulic Cement Concrete
C150/C150M-12	Portland Cement
C171-07	Sheet Materials for Curing Concrete
C172/C172M-10	Sampling Freshly Mixed Concrete
C173/C173M-12	Air Content of Freshly Mixed Concrete by the Volumetric Method
C192/C192M-12a	Making and Curing Concrete Test Specimens in the Laboratory
C231/C231M-10	Air Content of Freshly Mixed Concrete by the Pressure Method
C260/C260M-10a	Air-Entraining Admixtures for Concrete
C494/C494M-13	Chemical Admixtures for Concrete
C618-12a	Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
D1751-04(R2008)	Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
E1155-96(2008)	Determining FF Floor Flatness and FL Floor Levelness Numbers

PART 2 - PRODUCTS

2.1 FORMS

A. Wood, plywood, metal, or other materials, approved by SRE/COR, of grade or type suitable to obtain type of finish specified.

B. Form releasing agents to be commercial formulations that will not bond with, stain or adversely affect concrete surfaces. Agents must not impair subsequent treatment of concrete surfaces depending upon bond or adhesion nor impede the wetting of surfaces to be cured with water or curing compounds. If special form liners are to be used, follow the recommendation of the form coating manufacturer. Submit manufacturer's

recommendation on method and rate of application of form releasing agents.

2.2 MATERIALS

A. Portland Cement: ASTM C150, Type I or II.

B. Fly Ash: ASTM C618, Class C or F including supplementary optional requirements relating to reactive aggregates and alkalis, and loss on ignition (LOI) not to exceed 5 percent.

C. Coarse Aggregate: ASTM C33, Size 67. Size 467 may be used for footings and walls over 300 mm (12 inches) thick. Provide Size 7 coarse aggregate for applied topping.

D. Fine Aggregate: ASTM C33.

E. Mixing Water: Fresh, clean, and potable.

F. Air-Entraining Admixture: ASTM C260.

G. Chemical Admixtures: ASTM C494.

H. Vapor Barrier: ASTM E1745, 0.38 mm (15 mil).

I. Reinforcing Steel: ASTM A615 or ASTM A996, deformed. See structural drawings for grade.

J. Welded Wire Fabric: ASTM A185.

K. Expansion Joint Filler: ASTM D1751.

L. Sheet Materials for Curing Concrete: ASTM C171.

M. Abrasive Aggregates: Aluminum oxide grains or emery grits.

N. Liquid Densifier/Sealer: 100 percent active colorless aqueous siliconate solution.

O. Grout, Non-Shrinking: Premixed ferrous or non-ferrous, mixed and applied in accordance with manufacturer's recommendations. Grout cannot show settlement or vertical drying shrinkage at 3 days or thereafter based on initial measurement made at time of placement. Grout must produce a compressive strength of minimum 18 MPa (2500 psi) at 3 days and minimum 35 MPa (5000 psi) at 28 days.

P. Form Ties - Form ties utilized in areas of exposed concrete will be of cone type breakaway, where metal is inset greater than ½ inch from surface.

2.3 CONCRETE MIXES

A. Design of concrete mixes using materials specified as set forth under Option C of ASTM C94.

B. Compressive strength at 28 days: Minimum 30 MPa - 4000 psi.

C. Establish strength of concrete by testing prior to beginning concreting operation. Test consists of average of three cylinders made and cured in accordance with ASTM C192 and tested in accordance with ASTM C39.

D. Maximum slump for vibrated concrete is 100 mm (4 inches) tested in accordance with ASTM C143.

E. Cement and water factor (See Table I):

TABLE I – CEMENT AND WATER FACTORS FOR CONCRETE

Concrete: Strength	Non-Air-Entrained		Air-Entrained	
Min. 28 Day Comp. Str. MPa (psi)	Min. Cement kg/m³ (lbs/c. yd)	Max. Water Cement Ratio	Min. Cement kg/m³ (lbs/c. yd)	Max. Water Cement Ratio
35 (5000)[1,3]	375 (630)	0.45	385 (650)	0.40
30 (4000)[1,3]	325 (550)	0.55	340 (570)	0.50
25 (3000)[1,3]	280 (470)	0.65	290 (490)	0.55
25 (3000)[1]	300 (500)	*	310 (520)	*

1. If trial mixes are used, the proposed mix design must achieve a compressive strength 8.3 MPa (1200 psi) in excess of f'c. For concrete strengths above 35 Mpa (5000 psi), the proposed mix design must achieve a compressive strength 9.7 MPa (1400 psi) in excess of f’c.

3. For concrete exposed to high sulfate content soils maximum water cement ratio is 0.44.

* Determined by Laboratory in accordance with ACI 211.1 for normal concrete.

F. Air-entrainment is required for all exterior concrete and as required for Section 32 05 23, CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS. Air content must conform with ACI 318 Table 4.4.1.

2.4 BATCHING AND MIXING

A. Store, batch, and mix materials as specified in ASTM C94.

1. Job-Mixed: Mix in a batch mixer in manner specified for stationary mixers in ASTM C94.

2. Ready-Mixed: Comply with ASTM C94, except use of non-agitating equipment for transporting concrete to the site will not be permitted. With each load of concrete delivered to project, ready-mixed concrete producer must furnish, in duplicate, certification as required by ASTM C94.

PART 3 – EXECUTION

3.1 FORMWORK

A. Installation conforms to ACI 347. Sufficiently tight to hold concrete without leakage, sufficiently braced to withstand vibration of concrete, and to carry, without appreciable deflection while remaining within allowable construction tolerances, all dead and live loads to which they may be subjected.

B. Treating and Wetting: Treat or wet contact forms as follows:

1. Coat plywood and board forms with non-staining form sealer. In hot weather cool forms by wetting with cool water just before concrete is placed.
2. Clean and coat removable metal forms with light form oil before reinforcement is placed. In hot weather, cool metal forms by thoroughly wetting with water just before placing concrete.
3. Use sealer on reused plywood forms as specified for new material.

C. Inserts, sleeves, and similar items: Flashing reglets, masonry ties, anchors, inserts, wires, hangers, sleeves, boxes for floor hinges and other items specified as furnished under this and other sections of specifications are required to be in their final position at time concrete is placed - properly located, accurately positioned, built into construction, and maintained securely in place.

D. Construction Tolerances:

1. Set and maintain concrete formwork to assure erection of completed work within tolerances specified to accommodate installation or other rough and finish materials.
2. Cast-in-place concrete installed as part of, or in the complexes surrounding, columbarium elements to have concrete (on or above finished grade) constructed to dimensions indicated on Drawings within 6 mm (1/4 inch) of location and elevation.
3. Engage a professional surveyor to survey the form work for the exposed portions of the foundations for the columbarium, including wall segments, piers and/or columns, prior to concrete being poured. If the forms are not correct, they must be corrected and resurveyed. When correct, provide a written certification from the surveyor, to the RE/COR, that the forms are set according to the plans, within the allowable tolerances for elevation, location, orientation, and dimensions called for on the plans.

4. Properly brace the forms so the set concrete is correct within the allowable construction tolerances when the forms are removed.
5. Upon removal of the forms, the professional surveyor must survey the placed concrete and provide information to the RE/COR where the work is not in conformance with the design drawings, within the allowable construction tolerances. The work cannot progress until the exposed concrete for the foundations are brought into compliance.
6. Remedial work necessary for correcting installations that is in excess of allowable tolerances are the responsibility of the Contractor.
7. Erected work that exceeds specified tolerance limits must be remedied or removed and replaced, at no additional cost to the Government.
8. Any remediation work is subject to approval of the RE/COR in advance of the work.
9. Permissible surface irregularities for various classes of materials are defined as "finishes" in specification sections covering individual materials. They are to be distinguished from tolerances specified which are applicable to surface irregularities of structural elements.

3.2 REINFORCEMENT

A. Details of concrete reinforcement, unless otherwise shown, in accordance with ACI 318 and ACI SP-66. Support and securely tie reinforcing steel to prevent displacement during placing of concrete.

3.3 VAPOR BARRIER

A. Except where membrane waterproofing is required, place interior concrete slabs on a continuous vapor barrier.
B. Place 100 mm (4 inches) of fine granular fill over the vapor barrier to act as a blotter for concrete slab.
C. Lap joints 150 mm (6 inches) and seal with a compatible pressure-sensitive tape.
D. Patch punctures and tears.

3.4 PLACING CONCRETE

A. Remove water from excavations before concrete is placed. Remove hardened concrete, debris and other foreign materials from interior of forms, and from inside of mixing and conveying equipment. Obtain

approval of SRE/COR before placing concrete. Provide screeds at required elevations for concrete slabs.

B. Roughen and clean set concrete free from laitance, foreign matter, and loose particles, before placing new concrete on or against concrete which has set.

C. Convey concrete from mixer to final place of deposit by method which will prevent segregation or loss of ingredients. Do not deposit in work concrete that has attained its initial set or has contained its water or cement more than 1 1/2 hours. Do not allow concrete to drop freely more than 1500 mm (5 feet) in unexposed work nor more than 900 mm (3 feet) in exposed work. Place and consolidate concrete in horizontal layers not exceeding 300 mm (12 inches) in thickness. Consolidate concrete by spading, rodding, and mechanical vibrator. Do not secure vibrator to forms or reinforcement. Provide vibration continuously with placing of concrete.

D. Hot weather placing of concrete: Follow recommendations of ACI 305R to prevent problems in the manufacturing, placing, and curing of concrete that can adversely affect the properties and serviceability of the hardened concrete.

E. Cold weather placing of concrete: Follow recommendations of ACI 306R, to prevent freezing of thin sections less than 300 mm (12 inches) and to permit concrete to gain strength properly, except that use of calcium chloride cannot be used without written approval from RE/COR.

3.5 PROTECTION AND CURING

A. Protect exposed surfaces of concrete from premature drying, wash by rain or running water, wind, mechanical injury, and excessively hot or cold temperature. Curing method is subject to approval by RE/COR.

3.6 FORM REMOVAL

A. Forms remain in place until concrete has a sufficient strength to carry its own weight and loads supported. Removal of forms at any time is the Contractor's sole responsibility.

3.7 SURFACE PREPARATION

A. Immediately remove loose materials, after forms have been removed and work has been examined and approved by SRE/COR, and patch all stone pockets, surface honeycomb, or similar deficiencies with cement mortar made with 1 part portland cement and 2 to 3 parts sand.

B. For exposed surfaces of concrete for the columbarium walls in their complexes, follow the procedures identified in Paragraph FINISHES for Exterior Exposed Areas (finished).

C. For columbarium and their complexes, immediately after forms are removed, take steps to prepare and smooth the exposed portions of the concrete. Remove the form marks, including joint marks, fins, burrs and similar projections to produce a smooth surface. Complete the surface finish to result in a uniform textured surface with homogeneous color, unless surface is to be otherwise treated. Work must be as approved during the review of the mock-up.

3.8 FINISHES

A. Vertical and Overhead Surface Finishes:

1. Unfinished Areas: Vertical and overhead concrete surfaces exposed in unfinished areas, above suspended ceilings in manholes, and other unfinished areas exposed or concealed will not require additional finishing.
2. Interior and Exterior Exposed Areas (to be painted): Fins, burrs and similar projections on surface must be knocked off flush by mechanical means approved by SRE/COR and rubbed lightly with a fine abrasive stone or hone. Use an ample amount of water during rubbing without working up a lather of mortar or changing texture of concrete.
3. Interior and Exterior Exposed Areas (finished): Provide grout finish of uniform color and smooth finish treated as follows:
   a. After concrete has hardened and laitance, fins and burrs have been removed, scrub concrete with wire brushes. Clean stained concrete surfaces by use of a hone or stone.
   b. Apply grout composed of 1 part Portland cement and 1 part clean, fine sand (smaller than 600 micro-m (No. 30) sieve). Work grout into surface of concrete with cork floats or fiber brushes until all pits and honeycomb are filled.
   c. After grout has hardened, but still plastic, remove surplus grout with a sponge rubber float and by rubbing with clean burlap.
   d. In hot, dry weather use a fog spray to keep grout wet during setting period. Complete finish for any area in same day. Confine limits of finished areas to natural breaks in wall surface. Do not leave grout on concrete surface overnight.

e. At a minimum, provide grout finish 12” below finished grade where exposed concrete meets grade.

B. Slab Finishes (Horizontal/Flatwork Finished):

1. Scratch Finish: Slab surfaces to receive a bonded applied cementitious application must be thoroughly raked or wire broomed after partial setting (within 2 hours after placing) to roughen surface and ensure a permanent bond between base slab and applied cementitious materials.
2. Floating: Allow water brought to surface by float used for rough finishing to evaporate before surface is again floated or troweled. Do not sprinkle dry cement on surface to absorb water.
3. Float Finish: Screen and float ramps, stair treads, and platforms, both interior and exterior, equipment pads, and slabs to receive non-cementitious materials, except as specified, to a smooth dense finish. Check for alignment using a straightedge or template after first floating and while surface is still soft. Correct high spots by cutting down with a trowel or similar tool and correct low spots by filling in with material of same composition as floor finish. Remove any surface projections on floated finish by rubbing or dry grinding. Refloat the slab to a uniform sandy texture.
4. Steel Trowel Finish: Applied toppings, concrete surfaces to receive resilient floor covering or carpet, future floor roof and all monolithic concrete floor slabs exposed in finished work and for which no other finish is shown or specified must be steel troweled. Delay final steel troweling to secure a smooth, dense surface as long as possible, generally when the surface can no longer be dented with finger. During final troweling, tilt steel trowel at a slight angle and exert heavy pressure on trowel to compact cement paste and form a dense, smooth surface. Finished surface must be free of trowel marks, uniform in texture and appearance.
5. Broom Finish: Finish all exterior slabs, ramps, and stair treads with a bristle brush moistened with clear water after the surfaces have been floated.
6. Finished slab flatness (FF) and levelness (FL) values must comply with the following minimum requirements:

Slab On Grade	
Specified overall value F_F 25/F_L 20	

Slab On Grade	
Minimum local value F_F 17/F_L 15	

3.9 SURFACE TREATMENTS

A. Mix and apply surface treatments in accordance with manufacturer's printed instructions.

B. Liquid Densifier/Sealer: Use on all exposed concrete floors and concrete floors to receive carpeting except those specified to receive non-slip finish.

C. Non-Slip Finish: Except where safety nosing and tread coverings are shown, apply non-slip abrasive aggregate to treads and platforms of all concrete steps and stairs, and to surfaces of exterior concrete ramps and platforms. Broadcast aggregate uniformly over concrete surface. Trowel concrete surface to smooth dense finish. After curing, rub the treated surface with abrasive brick and water sufficiently to slightly expose abrasive aggregate.

3.10 APPLIED TOPPING

A. Separate concrete topping with thickness and strength shown with only enough water to insure a stiff, workable, plastic mix.

B. Continuously place applied topping until entire section is complete, struck off with straightedge, compact by rolling or tamping, float and steel trowel to a hard smooth finish.

3.11 PRECAST CONCRETE ITEMS

A. Cast precast concrete items, not specified elsewhere, using 25 MPa (3000 psi) air-entrained concrete to shapes and dimensions shown. Finish surfaces to match corresponding adjacent concrete surfaces. Reinforce with steel as necessary for safe handling and erection.

- - - E N D - - -

SECTION 04 72 00
CAST STONE MASONRY

PART 1 – GENERAL

1.1 DESCRIPTION

A. This section specifies concrete building units manufactured and installed to simulate natural cut stone. Cast Stone is made from fine and coarse aggregates, Portland cement, mineral oxide color pigments, chemical admixtures and water to simulate a natural stone.

B. Unless specifically indicated otherwise, cast stone provided for this project is to be wet-cast type.

1.2 RELATED WORK

A. Cast-in-place concrete columbarium complexes: Section 03 30 53, (SHORT FORM) CAST-IN-PLACE CONCRETE.

B. Joint Sealant and Application: Section 07 92 00, JOINT SEALANTS.

C. Color and texture specified in Section 09 06 00, SCHEDULE FOR FINISHES.

1.3 SUSTAINABILITY REQUIREMENTS (NOT USED)

1.4 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Samples:

1. Provide cast stone sample panel, minimum size 100 by 300 by 300 mm (4 by 12 by 12 inches), for each color and each finish.
2. Show finish on two 100 mm (4 inch) edges and 300 by 300 mm (12 by 12 inch) surface.
3. For caps, samples must demonstrate the color and finish for all exposed surfaces; include samples of edges and drip slots.

C. Shop Drawings:

1. Cast stone showing exposed faces, profiles, cross sections, anchorage, reinforcing, jointing and sizes.
2. For any caps, the approved shop drawings must indicate which surfaces will be exposed in the final installation.
3. Setting drawings with setting mark.
4. Lifting Devices:
   a. Submit design details for lifting devices (not straps or slings) that will support the pieces at vertical lifting points using protective pads of materials that won’t damage the stone.
   b. Lifting devices are required for all cap stones.

c. Design lifting devices that function to safely lift cap stones by contacting the stones on the bottom finished edges, where the drip slots are located, so the units can be set into position without causing any marking or damage to the stones.

D. Certificates: Test results indicating that the cast stone meets specification requirements and proof of plant certification; certification documents must be current within one year of preconstruction meeting.

E. Submit manufacturers test results of cast stone previously made by manufacturer, indicating compliance with ASTM C1364.

F. Laboratory Qualifications: Description of testing laboratories facilities and qualifications of its principals and key personnel.

G. List of jobs furnished by the manufacturer, which were similar in scope and at least three (3) years of age.

H. Installer Qualifications: Provide documentation of requirements specified herein.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Store cast stone under waterproof covers on planking clear of ground.

B. Protect from handling, dirt, stain, and water damage.

C. Mark production units with the identification marks as shown on the shop drawings.

D. Package units and protect them from staining or damage during shipping and storage.

E. Provide packaging and lifting devices from the manufacturer that are designed to permit the installer easy removal for inspection, or to handle the cast stone for installation without causing damage to the units.

F. Provide an itemized list of products to support the bill of lading.

1.6 WARRANTY

A. Warranty exterior masonry walls against moisture leaks, any defects and subject to terms of the Warranty of Construction.

1.7 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

B. American Concrete Institute (ACI):

318/318M-11	Building Code Requirements for Structural Concrete and Commentary

C. Architectural Precast Association; certification program.

D. American Society for Testing and Materials (ASTM):

A167-99(2009)	Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
A185/A185M-07	Steel, Welded Wire Reinforcement, Plain, for Concrete
A240/A240M-13a	Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
A276-13	Stainless Steel Bars and Shapes
A615/A615M-12	Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
A666	Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
C33/C33M-13	Concrete Aggregates
C150/C150M-12	Portland Cement
C260/C260M-10a	Air-Entraining Admixtures for Concrete
C426-10	Linear Drying Shrinkage of Concrete Masonry Units
C494/C494M-13	Chemical Admixtures for Concrete
C503/C503M-10	Marble Dimension Stone
C568/C568M-10	Limestone Dimension Stone
C615/C615M-11	Granite Dimension Stone
C616/C616M-10	Quartz-Based Dimension Stone
C618-12a	Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
C979/C979M-10	Pigments for Integrally Colored Concrete
C989/C989M-13	Slag Cement for Use in Concrete and Mortars
C1194-03(2011)	Compressive Strength of Architectural Cast Stone
C1195-03(2011)	Absorption of Architectural Cast Stone
C1364-10b	Architectural Cast Stone

D2244-11 Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

E. Cast Stone Institute Technical Manual and Cast Stone Institute standard specifications.

1.8 QUALITY ASSURANCE

A. Manufacturer:

1. Must have five years minimum continuous operating experience, and have facilities for producing cast stone of the shapes, quantities and size required for this project.
2. Must be a producer certified by the Cast Stone Institute or the Architectural Precast Association.
3. Producer assumes responsibility for engineering units to comply with performance requirements and use indicated, including a comprehensive engineering analysis by a qualified professional engineer who is licensed in their place of practice and who is experienced in providing engineering services of the kind indicated.
4. Shop drawings to bear seal and signature of professional engineer responsible for the design and preparation.

B. Installer:

1. Must provide documentation demonstrating that they have a minimum of five years' experience setting cast or natural building stone.
2. Provide written handling and installation procedures that will be followed for the installation of the work for cast stones lifted, moved, adjusted in any way, other than by hand. Describe procedure starting at the inspection of the products once delivered to the site, and continue through the final setting of the cast stone units with them being secured into place in the work. Include procedures with description of the equipment that will be used, as well as all protection procedures to be followed, to ensure that no exposed surfaces or edges of the cast stone are damaged during handling or installation.
3. Provide written procedures for removal and replacement of cast stone units that have been damaged on any edges or faces that will be visible in the final installation, including drip slots.

4. Provide procedures for inspection and identification of any exposed damage, with procedures for immediate marking of the units to be removed and replaced prior to grouting or sealing of joints.

C. Testing:

1. Follow the procedures in ASTM C1364.
2. One (1) sample from production units may be selected at random from the field for each 14 m^3 (500 cubic feet) delivered to the job:
   a. Three (3) field cut cube specimens from each of these sample to have an average minimum compressive strength of not less than 85 percent with no single specimen testing less than 75 percent of design strength as specified.
   b. Three (3) field cut cube specimens from each of these samples to have an average maximum cold-water absorption of 6 percent.
   c. Test field specimens in accordance with ASTM C1194 and C1195.
   d. Manufacturer to submit a written list of projects similar and at least three (3) years of age, along with owner, architect and contractor references.

D. Pre-Installation Conference: Convene a meeting on site, after submittals are received and approved but before any work, to review drawings and specifications, submittals, schedule, manufacturer instructions, site logistics and pertinent matters of coordination, temporary protection, governing regulations, tests and inspections; participants to include RE/COR and all parties whose work is effected or related to the work of this section.

1.9 MANUFACTURING TOLERANCES

A. Cross section dimensions must not deviate by more than + 3 mm (1/8 in.) from approved dimension.

B. Length of units must not deviate by more than length 3 mm (/360 or + 1/8 in.), whichever is greater, not to exceed 6 mm (+ 1/4 in.) Maximum length of any unit must not exceed 15 times the average thickness of such unit unless otherwise agreed by the manufacturer.

C. Warp bow or twist of units must not exceed length 3 mm (/360 or + 1/8 in.), whichever is greater.

D. Location of dowel holes, anchor slots, flashing grooves, false joints and similar features - On formed sides of unit, 3 mm (1/8 in.), on unformed sides of unit, 9 mm (3/8 in.) maximum deviation.

1.10 MOCK-UP

A. See section 01 43 39 MOCKUP REQUIREMENTS.

1.11 PROJECT CONDITIONS

A. Field Measurements: Verify actual conditions to receive cast stone components by field measurements before production.

B. Dimensions on shop drawings to be based upon field measurements.

PART 2 - PRODUCTS

2.1 ARCHITECTURAL CAST STONE

A. Comply with ASTM C1364.

B. Physical Properties: Provide the following:

1. Compressive Strength - ASTM C1194: 45 Mpa (6,500 psi) minimum for products at 28 days.
2. Absorption - ASTM C1195: 6 percent maximum by the cold water method, or 10 percent maximum by the boiling method for products as 28 days.
3. Air Content for Wet Cast Product - ASTM C173 or C231: 4-8 percent for units exposed to freeze-thaw environments.
4. Freeze Thaw - ASTM C1364: The cumulative percent weight loss (CPWL) less than 5 percent after 300 cycles of freezing and thawing.
5. Linear Shrinkage - ASTM C426: Maximum 0.065 percent.

C. Job Site Testing - One (1) sample from production units may be selected at random from the field for each 14m^3 (500 cubic feet) delivered to the job site:

1. Three (3) field cut cube specimens from each of these samples must have an average minimum compressive strength of not less than 85 percent with no single specimen testing less than 75 percent of design strength as allowed by ACI 318.
2. Three (3) field cut cube specimens from each of these samples must have an average maximum cold-water absorption of 6 percent.
3. Test field specimens in accordance with ASTM C1194 and C1195.

2.2 RAW MATERIALS

A. Portland Cement: Type I or Type III, white and/or grey, ASTM C150.

B. Coarse Aggregates: Granite, quartz or limestone, ASTM C33, except for gradation, and are optional for the vibrant dry tamp (VDT) casting method.

C. Fine Aggregates: Manufactured or natural sands, ASTM C33, except for gradation.

D. Colors: Inorganic iron oxide pigments, ASTM C979 except that carbon black pigments cannot be used.

E. Admixtures: Comply with the following:

1. ASTM C260 for air-entraining admixtures.
2. ASTM C494/C495M Types A-G for water reducing, retarding, accelerating and high range admixtures.
3. Other Admixtures: Integral water repellents and other chemicals, for which no ASTM Standard exists, must be previously established as suitable for use in concrete by proven field performance or through laboratory testing.
   a. Produce units with water repellant accepted by fabricator within mix design; product for mix design and setting mortar to be from same source.
4. ASTM C618; do not use mineral admixtures of dark and variable colors in surfaces intended to be exposed to view.
5. ASTM C989; granulated blast furnace slag may be used to improve physical properties, as verified by testing documentation.

F. Water: Potable.

G. Reinforcing Bars:

1. ASTM A615/A615M, Grade 40 or 60 steel galvanized or epoxy coated when cover is less than 37 mm (1.5 in.).
2. Welded Wire Fabric: ASTM A185 where applicable for wet cast units.

H. Provide anchors, dowels and other anchoring devices and shims that are standard building stone anchors commercially available in a non-corrosive material such as zinc plated, galvanized steel, brass, or stainless steel Type 302 or 304.

2.3 COLOR AND FINISH

A. Match existing section markers, signage posts, flower watering station posts and post collars color and finish.

B. Provide fine-grained texture similar to natural stone, for surfaces intended to be exposed to view. Air voids are not permitted in excess of 0.8 mm (1/32 in.), and the density of such voids must be less than 3 occurrences per any 25 mm^2 (1 in^2). Air voids are not permitted when obvious under direct daylight illumination at a 1.5 m (5 ft.) distance.

C. Units must exhibit a texture of no less quality than the approved sample when viewed under direct daylight illumination at a 3 m (10 ft.) distance.

D. Units to comply with ASTM D2244 permissible variation in color between units of comparable age subjected to similar weathering exposure.
   1. Total color difference - not greater than 6 units.
   2. Total hue difference-not greater than 2 units.

E. Chipping on edges or surfaces of caps, where they will be visible in the final installation, whether resulting from shipment, delivery or other factors or causes is not acceptable, and the units must be removed and replaced with new units. For units, other than caps, minor chips may be allowed if they are not obvious under direct daylight illumination from a 1 m (3 ft.) distance as determined by the RE/COR.

F. The occurrence of crazing or efflorescence may constitute a cause for rejection, at the sole discretion of the RE/COR.

G. Remove cement film, if required, from exposed surface prior to packaging for shipment.

2.4 REINFORCING

A. Reinforce the units as required by the shop drawings, and prepared under direction of professional engineer, for safe handling and structural stress. Include adequate reinforcing to prevent the cast stone from breaking when supported by shims at the ends of the units, and having workers on top of the units.
   1. Reinforcing to be minimum 0.25 percent of the cross-section area.

B. Provide non-corrosive reinforcement where faces exposed to weather are covered with less than 38 mm (1.5 in.) of concrete material. Provide reinforcement with minimum concrete coverage of twice the diameter of the bars.

2.5 EMBEDDED ANCHORS AND OTHER INSERTS

A. Fabricate from stainless steel complying with ASTM A240/A240M, ASTM A276, or ASTM A666, Type 304.

2.6 CURING

A. Cure units in a warm curing chamber 537.8 C (1000 F) at 95 percent relative humidity for approximately 12 hours, or cure in a 95 percent moist environment at a minimum 371.1 C (700 F) for 16 hours after casting. Provide additional yard curing at 95 percent relative humidity and 350-degree-days (i.e. 7 days at 260.0 C (500 F) or 5 days at 371.1 C (700 F) prior to shipping. Protect form-cured units from moisture evaporation with curing blankets or curing compounds after casting.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Check cast stone materials for damage, coloration, finish, crazing, efflorescence, fit and finish prior to installation. Do not set unacceptable units.

3.2 SETTING TOLERANCES

A. Comply with the more stringent tolerances of the Cast Stone Institute℠ Technical Manual or this section.

B. Set stones 3 mm (1/8 in.) or less, within the plane of adjacent units.

C. Joints, plus – 1.5 mm (1/6 in.), minus – 3 mm (1/8 in.).

3.3 JOINTING

A. Joint Size:

1. At stone/brick joints 9.5 cm (3/8 in.).
2. At stone/stone joints in vertical position 9.5 mm (3/8 in.).
3. Stone/stone joint exposed on top 9.5 mm (3/8 in.).

B. Joint Materials:

1. Mortar, Type N, ASTM C270.
2. Use a full bed of mortar at all bed joints.
3. Flush vertical joints full with mortar.
4. Leave all joints with exposed tops or under relieving angles open for sealant.
5. Leave head joints in coping and projecting components open for sealant.

C. Location of Joints:

1. As shown on shop drawings.
2. At control and expansion joints unless otherwise shown.

3.4 SETTING

A. Mortar Bed Setting:

1. Drench units with clean water prior to setting.
2. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.
3. Set units in full bed of mortar containing water repellant, unless otherwise detailed.
4. Rake mortar joints 18 mm (3/4 in.) for pointing.
5. Remove excess mortar from unit faces immediately after setting.
6. Tuck point unit joints to a slight concave profile.

B. Shim Setting:

1. Set each piece on shims as indicated, minimum of two for each piece and four for each cap piece.
2. Set shims where located on the shop drawings.
   a. Caps on Precast Niche Units:
      1) Place shims directly above the vertical webs below, where the web is not abutting an open-ended unit.
      2) Install shims one full web back from any open-ended joint in the precast niche units (approximately 12 inches back from the open ended joint).
   b. Install shims on cast-in-place concrete or filled CMU as indicated on the shop drawings.
3. Furnish and install cap supporting non-shrink grout as part of the shim type of cap installation, with the supporting non-shrink grout being installed as indicated on the shop drawings, only at locations that are directly over vertical webs below.

3.5 JOINT PROTECTION

A. Comply with requirements of Section 07 92 00, JOINT SEALANTS.

B. Prime ends of units, insert properly sized backing rod at the correct depth and install required sealant.

3.6 REPAIR AND CLEANING

A. Repair chips with touchup materials furnished by manufacturer.

B. Saturate units to be cleaned prior to applying an approved masonry cleaner.

C. Consult with manufacturer for appropriate cleaners.

3.7 INSPECTION AND ACCEPTANCE

A. Inspect finished installation according to Bulletin #36 published by the Cast Stone Institute except distance for measuring acceptability to be reduced to 1 m (3 ft.).

- - - E N D - - -

SECTION 07 92 00
JOINT SEALANTS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Section covers all sealant and caulking materials and their application, wherever required for complete installation of building materials or systems.

1.2 RELATED WORK

A. Sealing of site work concrete paving: Section 32 05 23, CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS.

B. Sealing joints in cast stone: Section 04 72 00, CAST STONE MASONRY.

1.3 QUALITY CONTROL

A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Product Testing: Obtain test results from a qualified testing agency based on testing current sealant formulations within a 12-month period.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021.
2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C920, and where applicable, to other standard test methods.
3. Test elastomeric joint sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C920 for adhesion and cohesion under cyclic movement, adhesion-in peel, and indentation hardness.
4. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.
5. Determine sealants will not stain joint substrates according to ASTM C1248.

D. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates in accordance with sealant manufacturer's recommendations:
   1. Locate test joints as directed by Contracting Officer.
   2. Conduct field tests for each application indicated below:
      a. Each type of elastomeric sealant and joint substrate indicated.
      b. Each type of non-elastomeric sealant and joint substrate indicated.
   3. Notify RE/COR seven days in advance of dates and times when test joints will be erected.

E. Meet VOC requirements of pertinent CARB and/or SCAQMD Rule for sealants VOC (4 percent by weight VOC or less in less than 16 ounce package or less than 250 g/L in larger package). All non-porous sealant primers must be below 250g/L and primers for porous substrates less than 775 g/L.
   1. Joints in mockups of assemblies specified in other sections, that are indicated to receive elastomeric joint sealants, which are specified by reference to this section.

1.4 SUSTAINABILITY REQUIREMENTS (NOT USED)

1.5 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's installation instructions for each product used.

C. Cured samples of exposed sealants for each color where required to match adjacent material.

D. Manufacturer's Literature and Data:
   1. Caulking compound.
   2. Primers.
   3. Sealing compound, each type, including compatibility when different sealants are in contact with each other.

1.6 PRE-INSTALLATION CONFERENCE

A. Convene a meeting on site, after submittals are received and approved but before any work, to review drawings and specifications, submittals, schedule, manufacturer instructions, site logistics and pertinent matters of coordination, temporary protection, governing regulations, tests and inspections; participants to include RE/COR and all parties whose work is effected or related to the work of this section.

1.7 PROJECT CONDITIONS

A. Environmental Limitations:

1. Do not proceed with installation of joint sealants under following conditions:

a. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 °C (40 °F).

b. When joint substrates are wet.

B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 DELIVERY, HANDLING, AND STORAGE

A. Deliver materials in manufacturers' original unopened containers, with brand names, date of manufacture, shelf life, and material designation clearly marked thereon.

B. Carefully handle and store to prevent inclusion of foreign materials.

C. Do not subject to sustained temperatures less than 5° C (40° F) or exceeding 32° C (90° F).

1.9 DEFINITIONS

A. Definitions of terms in accordance with ASTM C717 and as specified.

B. Back-up Rod: A type of sealant backing.

C. Bond Breakers: A type of sealant backing.

D. Filler: A sealant backing used behind a back-up rod.

1.10 WARRANTY

A. Warranty exterior sealing against leaks, adhesion, and cohesive failure, and subject to terms of Warranty of Construction, except that warranty period to be extended to five (5) years.

B. General Warranty: Special warranty specified in this Article will not deprive Government of other rights Government may have under other provisions of Contract Documents and are in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

1.11 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

B. American Society for Testing and Materials (ASTM):

C612-10	Mineral Fiber Block and Board Thermal Insulation
C717-12b	Standard Terminology of Building Seals and Sealants
C734-06(2012)	Low Temperature Flexibility of Latex Sealants after Artificial Weathering
C834-10	Latex Sealants
C919-12	Use of Sealants in Acoustical Applications
C920-11	Elastomeric Joint Sealants
C1021-08	Laboratories Engaged in Testing of Building Sealants
C1193-13	Use of Joint Sealants
C1248-08(2012)	Staining of Porous Substrate by Joint Sealants
C1330-02(2013)	Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants
D217-10	Cone Penetration of Lubricating Grease
D1056-07	Flexible Cellular Materials—Sponge or Expanded Rubber
E84-12c	Surface Burning Characteristics of Building Materials

C. California Air Resources Board (CARB)

D. South Coast Air Quality Management District (SCAQMD)

E. Sealant, Waterproofing and Restoration Institute (SWRI): The Professionals' Guide

PART 2 - PRODUCTS

2.1 SEALANTS

A. S-1:

1. ASTM C920, polyurethane.
2. Type M.
3. Class 25.
4. Grade NS.

5. Shore A hardness of 20-40.

B. S-2:

1. ASTM C920, polyurethane.
2. Type M.
3. Class 25.
4. Grade P.
5. Shore A hardness of 25-40.

C. S-3:

1. ASTM C920, polyurethane.
2. Type S.
3. Class 25, joint movement range of plus or minus 50 percent.
4. Grade NS.
5. Shore A hardness of 15-25.
6. Minimum elongation of 700 percent.

D. S-4:

1. ASTM C920 polyurethane.
2. Type S.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 25-40.

E. S-5:

1. ASTM C920, polyurethane.
2. Type S.
3. Class 25.
4. Grade P.

5. Shore hardness of 15-45.F. S-6:

1. ASTM C920, silicone, neutral cure.
2. Type S.
3. Class: Joint movement range of plus 100 percent to minus 50 percent.
4. Grade NS.
5. Shore A hardness of 15-20.

F. S-9:

1. ASTM C920 silicone.
2. Type S.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 25-30.

6. Non-yellowing, mildew resistant. G. S-12:
   1. ASTM C920, polyurethane.
   2. Type M/S.
   3. Class 25, joint movement range of plus or minus 50 percent.
   4. Grade P/NS.
   5. Shore A hardness of 25 to 50.

2.2 CAULKING COMPOUND

A. C-1: ASTM C834, acrylic latex.

B. C-2: Polymer-based acoustical sealant conforming to ASTM C919 must have a flame spread of 25 or less and a smoke developed rating of 50 or less when tested in accordance with ASTM E84. Acoustical sealant must have a consistency of 250 to 310 when tested in accordance with ASTM D217, and must remain flexible and adhesive after 500 hours of accelerated weathering as specified in ASTM C734, and must be non-staining.

2.3 COLOR

A. Match color of mortar joints at exposed masonry.

B. Match color of adjacent concrete at unpainted concrete.

C. Provide light gray or aluminum, unless specified otherwise, for other locations.

D. Provide light gray or white caulking, unless specified otherwise.

2.4 JOINT SEALANT BACKING

A. General: Provide sealant backings of material and type that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:
   1. Type C: Closed-cell material with a surface skin.

C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 32° C (minus 26° F). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid,

inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.5 FILLER

A. Mineral fiber board: ASTM C612, Type IVA.

B. Thickness same as joint width.

C. Depth to fill void completely behind back-up rod.

2.6 PRIMER

A. As recommended by manufacturer of caulking or sealant material.

B. Stain free type.

2.7 CLEANERS-NON POUROUS SURFACES

A. Chemical cleaners acceptable to manufacturer of sealants and sealant backing material, free of oily residues and other substances capable of staining or harming joint substrates and adjacent non-porous surfaces and formulated to promote adhesion of sealant and substrates.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect substrate surface for bond breaker contamination and unsound materials at adherent faces of sealant.

B. Coordinate for repair and resolution of unsound substrate materials.

C. Inspect for uniform joint widths and that dimensions are within tolerance established by sealant manufacturer.

3.2 PREPARATIONS

A. Prepare joints in accordance with manufacturer's instructions and as specified only when installers are ready to initiate sealant application as soon as practicable after preparation and before subsequent surface deterioration.

B. Clean surfaces of joint to receive caulking or sealants leaving joint dry to the touch, free from frost, moisture, grease, oil, wax, lacquer paint, or other foreign matter that would tend to destroy or impair adhesion.

1. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants.

2. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:
   a. Concrete.
   b. Masonry.
   c. Unglazed surfaces of ceramic tile.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
   a. Metal.
   b. Glass.
   c. Porcelain enamel.
   d. Glazed surfaces of ceramic tile.

C. Do not cut or damage joint edges.

D. Apply masking tape to face of surfaces adjacent to joints before applying primers, caulking, or sealing compounds.
   1. Do not leave gaps between ends of sealant backings.
   2. Do not stretch, twist, puncture, or tear sealant backings.
   3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

E. Apply primer to sides of joints wherever required by compound manufacturer's printed instructions.
   1. Apply primer prior to installation of back-up rod or bond breaker tape.
   2. Use brush or other approved means that will reach all parts of joints.

F. Take all necessary steps to prevent three-sided adhesion of sealants.

3.3 BACKING INSTALLATION

A. Install back-up material, to form joints enclosed on three sides as required for specified depth of sealant.

B. Where deep joints occur, install filler to fill space behind the back-up rod and position the rod at proper depth.

C. Cut fillers installed by others to proper depth for installation of back-up rod and sealants.

D. Install back-up rod, without puncturing the material, to a uniform depth, within plus or minus 3 mm (1/8 inch) for sealant depths specified.

E. Where space for back-up rod does not exist, install bond breaker tape strip at bottom (or back) of joint so sealant bonds only to two opposing surfaces.

F. Take all necessary steps to prevent three-sided adhesion of sealants.

3.4 SEALANT DEPTHS AND GEOMETRY

A. At widths, up to 6 mm (1/4 inch), sealant depth equal to width.

B. At widths over 6 mm (1/4 inch), sealant depth 1/2 of width up to 13 mm (1/2 inch) maximum depth at center of joint with sealant thickness at center of joint approximately 1/2 of depth at adhesion surface.

3.5 INSTALLATION

A. General:

1. Comply with manufacturer's written installation instructions for products and applications indicated.

B. For application of sealants, follow requirements of ASTM C1193 unless specified otherwise.

3.6 CLEANING

A. Fresh compound accidentally smeared on adjoining surfaces: Scrape off immediately and rub clean with a solvent as recommended by the caulking or sealant manufacturer.

B. After filling and finishing joints, remove masking tape.

C. Leave adjacent surfaces in a clean and unstained condition.

3.7 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.8 LOCATIONS

A. Exterior Building Joints, Horizontal and Vertical:

1. Metal to Metal: Type S-6, S-7.
2. Metal to Masonry or Stone: Type S-1.
3. Masonry to Masonry or Stone: Type S-1.

4. Stone to Stone: Type S-1.
5. Cast Stone to Cast Stone: Type S-1.
6. Threshold Setting Bed: Type S-1, S-3, S-4.
7. Masonry Expansion and Control Joints: Type S-6.
8. Wood to Masonry: Type S-1.

B. Horizontal Traffic Joints:

1. Concrete Paving, Unit Pavers: Type S-11 or S-12.

- - - E N D - - -

SECTION 09 06 00
SCHEDULE FOR FINISHES

SECTION 09 06 00–SCHEDULE FOR FINISHES

NCA Facility: Fort Sam Houston National Cemetery

Location: San Antonio, TX

Project No. and Name: Phase 3 Expansion & Improvements – Additional Road Repairs

Submission: Bid Documents

Date:08/01/2025

SECTION 09 06 00
SCHEDULE FOR FINISHES

PART I – GENERAL

1.1 DESCRIPTION

A. This section contains a coordinated system in which requirements for materials specified in other sections shown are identified by abbreviated material names and finish codes in the Room Finish Schedule or shown for other locations.

1.2 MANUFACTURERS

A. Manufacturer’s trade names and numbers used herein are only to identify colors, finishes, textures and patterns. Products of other manufacturer’s equivalent to colors, finishes, textures and patterns of manufacturers listed that meet requirements of technical specifications will be acceptable upon approval in writing by contracting officer for finish requirements.

1.3 SUBMITTALS

A. Submit in accordance with SECTION 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, provide quadruplicate samples for color approval of materials and finishes specified in this section.

B. Color Schedule: Submit full color schedule including manufacturers intending to be provided for project, with equivalent colors to selections provided by this section; format to match this section.

1.4 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

B. MASTER PAINTING INSTITUTE: (MPI)
Architectural Painting Specification Manual

PART 2 – PRODUCTS

2.1 DIVISION 03 – CONCRETE

A. SECTION 03 30 53, CAST IN PLACE CONCRETE (SHORT FORM)

Surface	Finish Description
Exposed Concrete (Vertical)	Grout Finish - Sack Rub
Concrete Slabs (Horizontal/Flatwork)	Scratch Finish

2.2 DIVISON 04 – MASONRY

A. SECTION 04 72 00, CAST STONE MASONRY

Type	Color	Finish
Section Markers, Signage Posts, Flower Watering Station Posts	Match Existing	Light Sandblast

2.14 DIVISION 32 – EXTERIOR IMPROVEMENTS

A. SECTION 32 17 23, PAVEMENT MARKINGS

Color	Manufacturer	Mfg. Color Name/No.
Yellow		
White		

B. SECTION 32 30 00, SITE FURNISHINGS

Item	Style Name/No.	Finish	Manufacturer	Mfg. Color Name/No.
Benches with Back	RB-28(VS),	Powder coat	Victor Stanley, Sitescapes, or approved equal.	Bronze
Benches without Back	RB-12(VS),	Powder coat	Victor Stanley, Sitescapes, or approved equal.	Bronze

Item	Style Name/No.	Finish	Manufacturer	Mfg. Color Name/No.
Trash Receptacles	RB-36(VS),	Powder coat	Victor Stanley, Sitescapes, or approved equal.	Bronze
Flower Water Station Spigot	Haws 6252EHLF, ADA compliant, Self-Closing, Plain End, Bib Faucet	Rough Brass Finish	Haws	
Tree Grates	Market Street	Natural Unfinished	Ironsmith	Cast Iron
Bollard	N/A	Painted	N/A	Yellow

- - - END - - -

SECTION 31 20 00
EARTH MOVING

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. This section specifies the requirements for furnishing all equipment, materials, labor, tools, and techniques for earthwork including, but not limited to, the following:
   1. Site preparation.
   2. Excavation.
   3. Filling and backfilling.
   4. Grading.
   5. Soil Disposal.
   6. Clean Up.

B. The Project Geotechnical reports are included as an appendix to the specification. These reports, including the recommendations and requirements will be considered part of the contract documents. Failure by the Contractor to follow recommendations provided in the Geotechnical Report will be at the Contractor's risk. No payment will be made for additional work resulting from failure to follow these recommendations.

   Geotechnical Reports Provided by:
   Terracon Consultants, Inc.,
   San Antonio Texas
   There are (2) geotechnical reports for this project in the appendix of the specification. One is for all work on NCA property while the other was performed on COSA property for the new access road.

1.2 DEFINITIONS

A. Unsuitable Materials:
   1. Fills: Topsoil; frozen materials; construction materials and materials subject to decomposition; clods of clay and stones larger than 75 mm (3 inches); organic material, including silts, which are unstable; and inorganic materials, including silts, too wet to be stable and any material with a liquid limit and plasticity index exceeding 40 and 15 respectively. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction, as defined by ASTM D 698.
   2. Existing Subgrade (Except Footing Subgrade): Same materials as 1.2.A.1, that are not capable of direct support of slabs, pavement,

and similar items with possible exception of improvement by compaction, proofrolling, or similar methods.

3. Existing Subgrade (Footings Only): Same as paragraph 1, but no fill or backfill. If materials differ from reference borings and design requirements, excavate to acceptable strata subject to Resident Engineer's approval.
4. Contractor is responsible for maintaining positive drainage away from excavations throughout construction. Suitable materials that have been made unsuitable as a result of runoff entering excavations, or from rainfall, will be restored to suitable condition or removed at no cost to the owner.

B. Building Earthwork: Earthwork operations required in area enclosed by a line located 1500 mm (5 feet) outside of principal building perimeter. It also includes earthwork required for auxiliary structures, buildings, columbaria, memorial walls, and crypt burial sections.

C. Trench Earthwork: Trenchwork required for utility lines.

D. Site Earthwork: Earthwork operations required in area outside of a line located 1500 mm (5 feet) outside of principal building perimeter and within new construction area with exceptions noted above.

E. Degree of compaction: Degree of compaction is expressed as a percentage of maximum density obtained by laboratory test procedure. This percentage of maximum density is obtained through use of data provided from results of field test procedures presented in ASTM D1556.

F. Fill: Satisfactory soil materials used to raise existing grades. In the Construction Documents, the term “fill” means fill or backfill as appropriate.

G. Backfill: Soil materials or controlled low strength material used to fill an excavation.

H. Unauthorized excavation: Removal of materials beyond indicated sub-grade elevations or indicated lines and dimensions without written authorization by the Resident Engineer. No payment will be made for unauthorized excavation or remedial work required to correct unauthorized excavation.

I. Authorized additional excavation: Removal of additional material authorized by the Resident Engineer based on the determination by the Government’s soils testing agency that unsuitable bearing materials are encountered at required sub-grade elevations. Removal of unsuitable material and its replacement as directed will be paid on basis of Conditions of the Contract relative to changes in work.

J. Subgrade: The undisturbed earth or the compacted soil layer immediately below granular sub-base, drainage fill, or topsoil materials.

K. Structure: Buildings, foundations, slabs, tanks, curbs, mechanical and electrical appurtenances, columbaria walls, crypt fields, cremains burial areas or other man-made stationary features constructed above or below the ground surface.

L. Borrow: Satisfactory soil imported from off-site for use as fill or backfill. On-site borrow may be obtained from over excavation of areas within the grading limits outside a 1:1 slope from limits of proposed current or future structures, roadways or gravesites as approved by the RE/COR. All on site borrow areas will be backfilled and compacted with on-site nonstructural fill materials.

M. Drainage course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.

N. Bedding course: Layer placed over the excavated sub-grade in a trench before laying pipe. Bedding course will extend up to the spring line of the pipe.

O. Sub-base Course: Layer placed between the sub-grade and base course for asphalt paving or layer placed between the sub-grade and a concrete pavement or walk.

P. Utilities include on-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

Q. Debris: Debris includes all materials located within the designated work area not covered in the other definitions and will include but not be limited to items like vehicles, equipment, appliances, building materials or remains thereof, tires, any solid or liquid chemicals or products stored or found in containers or spilled on the ground.

R. Contaminated soils: Soil that contains contaminates as defined and determined by the Resident Engineer or the Government’s testing agency.

S. Select Fill (Crypt Backfill): Specified soil material to be used over pre-placed Crypts to bring to finished grade.

T. Approved Subgrade: Subgrade that has been proof-rolled as required and approved for pavement construction by the geotechnical engineer and/or the RE/COR.

1.3 RELATED WORK

A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.

B. Safety requirements: Section 01 00 00, GENERAL CONDITIONS, Article, ACCIDENT PREVENTION.

C. Protection of existing utilities, fire protection services, existing equipment, roads, and pavements: Section 01 00 00, GENERAL REQUIREMENTS.
D. Subsurface Investigation: Section 01 00 00, GENERAL REQUIREMENTS, Article, PHYSICAL DATA.
E. Erosion Control: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS, and Section 32 90 00, PLANTING.
F. Site preparation: Section 02 41 00, DEMOLITION.
G. Paving sub-grade requirements: Section 32 12 16, ASPHALT PAVING.

1.4 CLASSIFICATION OF EXCAVATION

A. Unclassified Excavation: Removal and disposal of pavements and other man-made obstructions visible on surface; utilities, and other items including underground structures indicated to be demolished and removed; together with any type of materials regardless of character of material and obstructions encountered.

1.5 SUBMITTALS:

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
   1. Samples and gradation reports of all imported materials specified in this section proposed for use.
B. Furnish to Resident Engineer:
   1. Contactor will furnish resumes with all personnel involved in the project including Project Manager, Superintendent, and on-site Engineer. Project Manager and Superintendent should have at least 3 years of experience on projects of similar size.
   2. Soil and material samples.
      a. Classification in accordance with ASTM D2487 for each on-site or borrow soil material proposed for fill, backfill, engineered fill, or structural fill.
      b. Laboratory compaction curve in accordance with ASTM D 698 for each on site or borrow soil material proposed for fill, backfill, engineered fill, or structural fill.
      c. Test reports for compliance with ASTM D 2940 requirements for subbase material.
      d. Pre-excavation photographs and videotape in the vicinity of the existing structures to document existing site features, including surfaces finishes, cracks, or other structural blemishes that might be misconstrued as damage caused by earthwork operations.
      e. The Contractor will submit a scale plan daily that defines the location, limits, and depths of the area excavated.

1.6 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. American Association of State Highway and Transportation Officials (AASHTO):

T99-01(2004).....Moisture-Density Relations of Soils Using a 2.5 kg (5.5 lb) Rammer and a 305 mm (12 inch) Drop

T180-01(2004).....Moisture-Density Relations of Soils using a 4.54 kg (10 lb) Rammer and a 457 mm (18 inch) Drop

C. American Society for Testing and Materials (ASTM):

D448-12.....Standard Classification for Sizes of Aggregate for Road and Bridge Construction

D698-12e2.....Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft. lbf/ft3 (600 kN m/m3))

D1556-15.....Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

D1557-12e1.....Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2700 kN m/m3))

D2167-15.....Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method

D2487-11.....Standard Classification of Soil for Engineering Purposes (Unified Soil Classification System)

D2922-05.....Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D2940-15.....Standard Specifications for Graded Aggregate Material for Bases or Subbases for Highways or Airports

D. Society of Automotive Engineers (SAE):

J732-92.....Specification Definitions - Loaders

J1179-02.....Hydraulic Excavator and Backhoe Digging Forces

PART 2 - PRODUCTS

2.1 MATERIALS

General: Follow the geotechnical report for all fill(s), placement, compaction, and testing. If not defined in the geotechnical report then the below definitions will be followed. Provide borrow soil material when sufficient satisfactory soil materials are not available from

excavations. On-site borrow may be obtained from over excavation of areas within the grading limits outside a 1:1 slope from limits of proposed current or future structures, roadways or gravesites as approved by the RE/COR. All on site borrow areas will be backfilled and compacted with on-site nonstructural fill materials.

A. Fills: Material in compliance with ASTM D2487 Soil Classification Groups GW, GP, GM, SW, SP, SM, SC, CL and ML, or any combination of these groups; free of rock or gravel larger than 75 mm (3 inches) in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter. Material approved from on site or off site sources having a minimum dry density of 1760 kg/m3 (110 pcf), a maximum Plasticity Index of 15, and a maximum Liquid Limit of 40.

B. Engineered Fill/Structural Fill: Naturally or artificially graded mixture of compliance with ASTM D2487 Soil Classification Groups GW, GP, GM, SW, SP, SM, SC, and CL, ML, or any combination of these groups, or as approved by the Geotechnical Engineer or material with at least 90 percent passing a 37.5-mm (1 1/2-inch) sieve and not more than 12 percent passing a 75-µm (No. 200) sieve, per ASTM D2940. Any structural fill will be approved by the geotechnical engineer prior to placement.

C. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940; except with 100 percent passing a 25 mm (1 inch) sieve and not more than 8 percent passing a 75-µm (No. 200) sieve.

D. Drainage Fill / Drainage Aggregate: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D448; coarse-aggregate grading Size 57; with 100 percent passing a 37.5 mm (1 1/2-inch) sieve and 0 to 5 percent passing a 2.36 mm (No. 8) sieve. Amount of material passing the 200 sieve by wash will be less than 8%.

E. Granular Fill:
   1. Under concrete building slabs, crushed stone or gravel graded from 25 mm (1 inch) to 4.75 mm (No. 4), per ASTM D2940.
   2. Pipe Bedding; crushed stone or gravel graded from 13 mm (1/2 inch) to 4.75 mm (No 4), per ASTM D2940.

F. Granular Select Fill/Granular Base Material: See geotechnical report page(16) for granular select fill and page(33) for Granular base material.

I. Select Fill: See geotechnical report pg(16)

G. Cohesive Select Fill: See geotechnical report.

H. Crypt Backfill: A blended material consisting of 50% (by volume) on-site excavated fill material and 50% imported sand. The material will

be well blended by utilizing a mechanical tumbler or screening spread. The on-site excavated fill will meet the requirements of fill, above, except that all rocks or gravel larger than 1 1/2 inch will be removed. The imported sand will be granular, rounded sand with no material greater than 1 inch and less than 12% passing the #200 sieve.

I. Decorative Aggregate (Flower Strip): Washed, narrowly graded mixture of uncrushed gravel coarse aggregate with 100 percent passing 3/4" sieve, 90-100 percent passing 1/2" sieve, 40-70 percent 3/8" sieve, and 0-15 percent passing No. 4 sieve and less than 5 percent passing the No. 8 sieve. Stone color to match existing gravel flower strips (brown-beige-white-gray).

J. Pea Gravel: See spec section 03 48 21 - Precast Concrete Burial Crypts.

K. Geo-Grid: See geotechnical report.

L. Non-woven Geo-Fabric: See spec section 32 12 16 - Asphalt Paving

PART 3 - EXECUTION

3.1 SITE PREPARATION

A. Clearing: Clear within limits of earthwork operations as shown. Work includes removal of trees, shrubs, fences, foundations, incidental structures, paving, debris, trash, and other obstructions. Remove materials from Cemetery Property.

B. Grubbing: Remove stumps and roots 75 mm (3 inch) and larger diameter. Roots up to 75 mm (3 inch) diameter, and nonperishable solid objects a minimum of 900 mm (3 feet) below subgrade or finished embankment may be left. Cemetery Projects: do not leave material within burial profile up to 2400 mm (8 feet) below finished grade of burial sections.

C. Trees and Shrubs: Trees and shrubs, not shown for removal, may be removed from areas within 4500 mm (15 feet) of new construction and 2250 mm (7.5 feet) of utility lines when removal is approved in advance by Resident Engineer. Remove materials from Cemetery Property. Trees and shrubs, shown to be transplanted, will be dug with a ball of earth and burlapped in accordance with latest issue of, "American Standard for Nursery Stock" of the American Association of Nurserymen, Inc. Transplant trees and shrubs to a permanent or temporary position within two hours after digging. Maintain trees and shrubs held in temporary locations by watering as necessary and feeding semiannually with liquid fertilizer with a minimum analysis of 5 percent nitrogen, 10 percent phosphorus, and 5 percent potash. Maintain plants moved to permanent positions as specified for plants in temporary locations until conclusion of contract. Box, and otherwise protect from damage, existing

trees and shrubs which are not shown to be removed in construction area. Immediately repair damage to existing trees and shrubs by trimming, cleaning and painting damaged areas, including roots, in accordance with standard industry horticultural practice for the geographic area and plant species. Do not store building materials closer to trees and shrubs that are to remain, than farthest extension of their limbs.

D. Stripping Topsoil: Strip topsoil from within limits of earthwork operations as specified. Topsoil will be a fertile, friable, natural topsoil of loamy character and characteristic of locality. Topsoil will be capable of growing healthy horticultural crops of grasses. Stockpile topsoil and protect as directed by Resident Engineer. Eliminate foreign materials, such as weeds, roots, stones, subsoil, frozen clods, and similar foreign materials larger than 0.014 m3 (1/2 cubic foot) in volume, from soil as it is stockpiled. Retain topsoil on station. Remove foreign materials larger than 50 mm (2 inches) in any dimension from topsoil used in final grading. Topsoil work, such as stripping, stockpiling, and similar topsoil work will not, under any circumstances, be carried out when soil is wet so that the composition of the soil will be destroyed. Cemetery Projects: Test the soil for chemicals, pesticides and fertilizers if topsoil is to be removed from lands formerly utilized as farmland, to verify suitability for use as topsoil in the cemetery where new lawn areas are to be established.

E. Concrete Slabs and Paving: Score deeply or saw cut to insure a neat, straight cut, sections of existing concrete slabs and paving to be removed where excavation or trenching occurs. Extend pavement section to be removed a minimum of 300 mm (12 inches) on each side of widest part of trench excavation and insure final score lines are approximately parallel unless otherwise indicated. Remove material from Cemetery Property.

F. Lines and Grades: Registered Professional Land Surveyor or Registered Civil Engineer, specified in Section 01 00 00, GENERAL REQUIREMENTS, will establish lines and grades.

1. Grades will conform to elevations indicated on plans within the tolerances herein specified. Generally, grades will be established to provide a smooth surface, free from irregular surface changes. Grading will comply with compaction requirements and grade cross sections, lines, and elevations indicated. Where spot grades are indicated, the grade will be established based on interpolation of the elevations between the spot grades while maintaining appropriate

transition at structures and paving and uninterrupted drainage flow into inlets.

2. Locations of existing elevations indicated on plans are approximate, from a site survey that measured spot elevations and subsequently generated existing contours and spot elevations. Proposed spot elevations and contour lines have been developed utilizing the existing conditions survey and developed contour lines and may be approximate. Contractor is responsible to notify Resident Engineer of any differences between existing elevations shown on plans and those encountered on site by Surveyor/Engineer described above. Notify Resident Engineer of any differences between existing or constructed grades, as compared to those shown on the plans. No contract adjustments will be made for discrepancies of less than 6 inches.
3. Subsequent to establishment of lines and grades, Contractor will be responsible for any additional cut and/or fill required to ensure that site is graded to conform to elevations indicated on plans.
4. Finish grading is specified in Section 32 90 00, PLANTING.

G. Disposal: All materials removed from the property will be disposed of at a legally approved site, for the specific materials, and all removals will be in accordance with all applicable Federal, State and local regulations. No burning of materials is permitted onsite.

3.2 EXCAVATION

A. Shoring, Sheeting and Bracing: Shore, brace, or slope, its angle of repose or to an angle considered acceptable by the Resident Engineer, banks of excavations to protect workmen, banks, adjacent paving, structures, and utilities.

1. Design of the temporary support of excavation system is the responsibility of the Contractor.
2. Construction of the support of excavation system will not interfere with the permanent structure and may begin only after a review by the Resident Engineer.
3. Extend shoring and bracing to a minimum of 1500 mm (5 feet) below the bottom of excavation. Shore excavations that are carried below elevations of adjacent existing foundations.
4. If bearing material of any foundation is disturbed by excavating, improper shoring or removal of existing or temporary shoring, placing of backfill, and similar operations, the Contractor will provide a concrete fill support under disturbed foundations, as directed by Resident Engineer, at no additional cost to the Government. Do not

remove shoring until permanent work in excavation has been inspected and approved by Resident Engineer.

B. Excavation Drainage: Operate pumping equipment, and/or provide other materials, means and equipment as required to keep excavation free of water and subgrade dry, firm, and undisturbed until approval of permanent work has been received from Resident Engineer. Approval by the Resident Engineer is also required before placement of the permanent work on all subgrades.

C. Subgrade Protection: Protect subgrades from softening, undermining, washout, or damage by rain or water accumulation. Reroute surface water runoff from excavated areas and not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches. When subgrade for foundations has been disturbed by water, remove disturbed material to firm undisturbed material after water is brought under control. Replace disturbed subgrade in trenches with concrete or material approved by the Resident Engineer. The contractor will moisture condition or replace wet soils as required to obtain a passing subgrade. Failure to adequately protect the subgrade from moisture or to moisture condition wet soils will not constitute a DIFFERING SITE CONDITION.

D. Blasting: Blasting is not permitted.

E. Proofrolling:

1. After rough grade has been established in cut areas and prior to placement of fill in fill areas under buildings, pavements, and grave sites proofroll exposed subgrade with a fully loaded dump truck to check for pockets of soft material.
2. Proofrolling will consist of at least two complete passes with one pass being in a direction perpendicular to preceding one. Remove any areas that deflect, rut, or pump excessively during proof rolling, or that fail to consolidate after successive passes to suitable soils and replaced with compacted fill. Maintain subgrade until succeeding operation has been accomplished.
3. After review and approval by the RE/COR pavement section construction may commence on the approved subgrade.

F. Site Earthwork: Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation. Excavation will be accomplished as required by drawings and

specifications. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 25 mm (1 inch). Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, complying with OSHA requirements, and for inspections. Remove subgrade materials that are determined by Resident Engineer and/or Geotechnical Engineer as unsuitable, and replace with acceptable material. If there is a question as to whether material is unsuitable or not, the contractor will obtain samples of the material, under the direction of the Resident Engineer, and the materials will be examined by an independent testing laboratory for soil classification to determine whether it is unsuitable or not. When unsuitable material is encountered, and removed, contract price and time will be adjusted in accordance with Articles, DIFFERING SITE CONDITIONS, CHANGES and CHANGES-SUPPLEMENT of the GENERAL REQUIREMENTS as applicable. Adjustments to be based on volume in cut section only. Wet soils that can be moisture conditioned will not be considered a differing site condition.

1. Site Grading:
   a. Provide a smooth transition between adjacent existing grades and new grades.
   b. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
   c. Slope grades to direct water away from buildings and to prevent ponds from forming where not designed. Finish subgrades to required elevations within the following tolerances:
      1) Lawn or Unpaved Areas: Plus or minus 25 mm (1 inch).
      2) Walks: Plus or minus 13 mm (0.5 inch).
      3) Pavements: Plus or minus 13 mm (0.5 inch).
   d. Grading Inside Building Lines: Finish subgrade to a tolerance of 13 mm (1/2 inch) when tested with a 3000 mm (10 foot) straightedge.

3.3 FILLING AND BACKFILLING

A. General: Do not fill or backfill until all debris, water, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation. For fill and backfill, use excavated materials and borrow meeting the criteria specified herein, as applicable. Borrow will be supplied at no additional cost to the Government. Do not use unsuitable excavated materials. Do not backfill until foundation walls have been completed above grade and adequately braced, waterproofing or dampproofing applied, foundation drainage, and pipes coming in contact

with backfill have been installed and work inspected and approved by Resident Engineer.

B. Placing: Place materials in horizontal layers not exceeding 200 mm (8 inches) in loose depth for material compacted by heavy compaction equipment, and not more than 100 mm (4 inches) in loose depth for material compacted by hand-operated tampers and then compacted. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure. Place no material on surfaces that are muddy, frozen, or contain frost.

C. Compaction: Compact with approved tamping rollers, sheepsfoot rollers, pneumatic tired rollers, steel wheeled rollers, vibrator compactors, or other approved equipment (hand or mechanized) well suited to soil being compacted. Do not operate mechanized vibratory compaction equipment within 3000 mm (10 feet) of new or existing building walls without prior approval of Resident Engineer. Moisten or aerate material as necessary to provide moisture content that will readily facilitate obtaining specified compaction with equipment used. Compact soil to not less than the following percentages of maximum dry density, according to ASTM D698 or ASTM D1557 as specified below:

1. Fills, Embankments, and Backfill
   a. Under proposed structures, building slabs, steps, and paved areas, scarify and recompact top 300 mm (12 inches) of existing subgrade and each layer of backfill or fill material in accordance with ASTM D69895 percent.
   b. Curbs, curbs and gutters, ASTM D698, 98 percent.
   c. Under Sidewalks, scarify and recompact top 150 mm (6 inches) below subgrade and compact each layer of backfill or fill material in accordance with ASTM D698, 95 percent.
   d. Landscaped areas, top 400 mm (16 inches), ASTM D698, 85 percent.
   e. Landscaped areas, below 400 mm (16 inches) of finished grade, ASTM D698, 90 percent.
2. Natural Ground (Cut or Existing)
   a. Under building slabs, steps and paved areas, top 150 mm (6 inches), ASTM D698, 95 percent.
   b. Curbs, curbs and gutters, top 150 mm (6 inches), ASTM D698, 98 percent.
   c. Under sidewalks, top 150 mm (6 inches), ASTM D698, 95 percent.

3.4 GRADING

A. General: Uniformly grade the areas within the limits of this section, including adjacent transition areas. Smooth the finished surface within specified tolerance. Provide uniform levels or slopes between points where elevations are indicated, or between such points and existing finished grades. Provide a smooth transition between abrupt changes in slope.

B. Cut rough or sloping rock to level beds for foundations. In pipe spaces or other unfinished areas, fill low spots and level off with coarse sand or fine gravel.

C. Slope backfill outside building away from building walls for a minimum distance of 1800 mm (6 feet).

D. Finish grade earth floors in pipe basements as shown to a level, uniform slope and leave clean.

E. Finished grade will be at least 150 mm (6 inches) below bottom line of window or other building wall openings unless greater depth is shown.

F. Place crushed stone or gravel fill under concrete slabs on grade, tamped, and leveled. Thickness of fill will be 150 mm (6 inches) unless otherwise shown.

G. Finish subgrade in a condition acceptable to Resident Engineer at least one day in advance of paving operations. Maintain finished subgrade in a smooth and compacted condition until succeeding operation has been accomplished. Scarify, compact, and grade subgrade prior to further construction when approved compacted subgrade is disturbed by Contractor's subsequent operations or adverse weather.

H. Grading for Paved Areas: Provide final grades for both subgrade and base course to +/- 6 mm (0.25 inches) of indicated grades.

3.5 DISPOSAL OF UNSUITABLE AND EXCESS EXCAVATED MATERIAL

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Cemetery property.

B. Remove from site and dispose of any excess excavated materials after all fill and backfill operations have been completed.

C. Segregate all excavated contaminated soil designated by the Resident Engineer from all other excavated soils, and stockpile on site on two 0.15 mm (6 mil) polyethylene sheets with a polyethylene cover. A designated area will be selected for this purpose. Dispose of excavated contaminated material in accordance with State and Local requirements.

3.6 CLEAN UP

Upon completion of earthwork operations, clean areas within contract limits, remove tools, and equipment. Provide site clear, clean, free of debris, and suitable for subsequent construction operations. Remove all debris, rubbish, and excess material from Cemetery Property.

----- E N D -----

SECTION 31 23 19
DEWATERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Implementation of Erosion and Sedimentation Control Plan.
2. Dewater excavations, including seepage and precipitation.

B. Provide all labor, materials, tools, equipment, power, and services necessary for care of water and erosion control. Begin excavation work before the approved Erosion and Sedimentation Control Plan is in place.

1.2 RELATED REQUIREMENTS

A. Materials testing and inspection during construction: Section 01 45 29, TESTING LABORATORY SERVICES.

B. Submittal requirements as specified in Section 01 33 23 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

C. Protection of existing utilities, fire protection services, existing equipment, roads, and pavements: Section 01 00 01, GENERAL REQUIREMENTS.

D. Subsurface Investigation: Section 01 00 01, GENERAL REQUIREMENTS, Article 1.12, PHYSICAL DATA.

E. Erosion Control: Section 01 57 23, TEMPORARY STORM WATER POLLUTION CONTROLS.

1.3 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:

1. Show drawings and data with method employed in dewatering excavated areas, 30 days before commencement of excavation.
2. Show location, depth and size of well-points, headers, sumps, ditches, size and location of discharge lines, capacities of pumps and standby units, and detailed description of dewatering methods to be employed to convey water from site to adequate disposal. Show details of the dewatering facilities, including equipment and erosion protection. Include facilities and procedures for insuring discharge water quality according to the applicable provisions of

Erosion Control Plan or SWPPP or NPDES requirements, Section 01 57 23, TEMPORARY STORM WATER POLLUTION CONTROLS.

3. Include written report outlining control procedures to be adopted when a dewatering problem arises.
4. Submit materials in format acceptable to all regulatory agencies.

C. Inspection Reports.

D. All required permits.

E. Delegated Design Drawings and Calculations: Signed and sealed by responsible design professional.

1. Identify deviations from details shown on drawings.

1.4 QUALITY ASSURANCE

A. Permitting Requirements: Comply and obtain required Federal, State, and County permits where Work is performed.

B. Comply and provide information to Contracting Officer's Representative (COR), all conditions of regulating permits. Obtain written approval from COR before discontinuing operation of dewatering system.

PART 2 – PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Dewatering: Lower and control ground water table levels and hydrostatic pressures and control surface water.

2.2 SYSTEM PERFORMANCE

A. Delegated Design: Prepare submittal documents including design calculations and drawings signed and sealed by registered design professional, licensed in state where work is located.

1. Minor deviations to details shown on drawings to accommodate manufacturer’s standard products may be accepted by COR when deviations do not affect design concept and specified performance.

B. Design dewatering system complying with specified performance:

1. Size and Capacity: At least 300 mm (1 foot) below lowest foundation subgrade or bottom of pipe trench.
2. Reduce hydrostatic head below excavation surface minimum 300 mm (1 foot) until backfill has been completed at least 300 mm (1-foot) above the initial observed groundwater level.
3. Prevent loss of fines, seepage, boils, quick conditions or softening of foundation strata.
4. Maintain stability of sides and bottom of excavation.

5. Construction operations are performed in the dry subgrade.
6. Control of surface and subsurface water as part of dewatering requirements. Maintain adequate control.
   a. Stabilize excavated and constructed slopes not adversely affected by saturated soil.
   b. Control erosion.
   c. Flooding of excavations or damage to structures does not occur.
   d. Surface water drains away from excavations.
   e. Protect excavations of becoming wet from surface water before additional work is undertaken.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

A. Install dewatering system to lower and control ground surface water to permit excavation, construction of structure, and placement of backfill materials in dry conditions. Make dewatering system adequate to pre-drain the water-bearing strata above and below bottom of structure foundations, utilities and other excavations.

B. Reduce hydrostatic pressure head in water-bearing strata below structure foundations, utility lines, and other excavations, minimum 300 mm (1 foot) below prevailing excavation surface.

C. Operation:
   1. Place dewatering system in operation before excavation below ground water table. Operate system continuously 24 hours a day, 7 days a week until construction work below existing ground water level is complete.
   2. Place adequate weight of backfill material to prevent buoyancy before discontinuing operation of the system.

D. Water Disposal:
   1. Dispose water removed from excavations in such a manner as:
      a. Avoid endanger portions of work under construction or completed.
      b. Avoid inconvenience to Government or to others working near site.
      c. Comply with permit regulations for disposal of water.
      d. Control Runoff: Control runoff in work areas including but not limited to excavations, access roads, parking areas, laydown, and staging areas. Provide, operate, and maintain all ditches,

basins, sumps, culverts, site grading, and pumping facilities to divert, collect, and remove all water from the work areas. Remove water from work areas and dispose according to applicable permits.

2. Excavation Dewatering:
   a. Divert, collect, control, and remove water from construction work areas and excavations.
   b. Arrange drainage features and alter as required to avoid degradation of the final excavated surfaces.
   c. Utilize all necessary erosion and sediment control measures to avoid construction related degradation of natural water quality.
3. Remove and dispose surface and ground water entering excavations, trenches, and work areas during construction. Keep excavation dry during subgrade preparation and until construction is complete and pipe is installed to avoid damage from hydrostatic pressure, flotation, or other cause will result.

E. Standby Equipment:
1. Install complete standby equipment for immediate operation, as required to maintain de-watering on a continuous basis and in the event that all or any part of the system become inadequate or fail.

F. Corrective Action:
1. Perform work necessary to restore foundation soil and damaged structure resulting from failure of dewatering system.

G. Damages:
1. Immediately repair damages to adjacent facilities caused by dewatering operations.

- - - E N D - - -

SECTION 32 05 23
CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Site work concrete.
2. Curb, gutter, and combination curb and gutter.
3. Pedestrian Pavement: Walks flower/water stations mow strips wheelchair curb ramps and plaza areas.
4. Vehicular Pavement: Maintenance yards and driveways.
5. Equipment Pads: Transformers and irrigation field satellites.

1.2 RELATED REQUIREMENTS

A. Laboratory and Field Testing Requirements: Section 01 45 29, TESTING LABORATORY SERVICES.

B. Subgrade Preparation: Section 31 20 00, EARTH MOVING.

C. Concrete Materials, Quality, Mixing, Design and Other Requirements: Section 03 30 53, SHORT FORM CAST-IN-PLACE CONCRETE.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. American Association of State Highway and Transportation Officials (AASHTO):

1. M31M/M31-15 - Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
2. M55M/M55-09 - Steel Welded Wire Reinforcement, Plain, for Concrete, Single User.
3. M147-65 (2004) - Materials for Aggregate and Soil-Aggregate Subbase, Base, and Surface Courses.
4. M148-05 - Liquid Membrane-Forming Compounds for Curing Concrete.
5. M171-05 - Sheet Materials for Curing Concrete.
6. M182-05(2012) - Burlap Cloth Made from Jute or Kenaf and Cotton Mats.
7. M213-01(2010) - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
8. M233-86 - Boiled Linseed Oil Mixture for Treatment of Portland Cement Concrete.

9. T99-15 - Moisture-Density Relations of Soils Using a 2.5-kg. (5.5-lb) Rammer and a 305-mm (12-in.) Drop.
10. T180-15 - Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

C. American National Standards Institute (ANSI):
1. B101.3 - Wet DOCF of Common Hard Surface Floor Materials (Including Action and Limit Thresholds for the Suitable Assessment of the Measured Values).

D. ASTM International (ASTM):
1. A775/A775M-16 - Epoxy-Coated Steel Reinforcing Bars.
2. C94/C94M-16 - Ready-Mixed Concrete.
3. C143/C143M-15a - Slump of Hydraulic Cement Concrete.
4. C1116/C1116M-10a(2015) - Fiber-Reinforced Concrete.
5. D5893/D5893M-10 - Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements.
6. D6690-15 - Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.

1.4 PREINSTALLATION MEETINGS

A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this section.
1. Required Participants:
a. Contracting Officer's Representative (COR).
b. Architect/Engineer.
c. Inspection and Testing Agency.
d. Contractor.
e. Installer.
f. Manufacturer's field representative.
g. Other installers responsible for adjacent and intersecting work, including excavation, plantings, traffic markings and masonry.
2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.
a. Installation schedule.
b. Installation sequence.
c. Preparatory work.
d. Protection before, during, and after installation.
e. Installation.
f. Terminations.

g. Transitions and connections to other work.

h. Inspecting and testing.

i. Other items affecting successful completion.

3. Document and distribute meeting minutes to participants to record decisions affecting installation.

1.5 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:

1. Show size, configuration, and fabrication and installation details.
2. Show reinforcing.
3. Include jointing plan for concrete pavements, curbs and gutters.

C. Manufacturer's Literature and Data:

1. Description of each product.
   a. Expansion joint filler.
   b. Hot poured sealing compound.
   c. Reinforcement.
   d. Curing materials.
2. Installation instructions.

D. Test Reports: Certify products comply with specifications.

1. Job-mix formula.
2. Select subbase materials.

E. Certificates: Certify products comply with specifications.

1. Expansion joint filler.
2. Reinforcement.
3. Curing materials.
4. Concrete protective coating.

F. Qualifications: Substantiate qualifications comply with specifications.

1. Installer with project experience list.
2. Land surveyor.

G. Concrete mix design.

H. Select subbase job-mix design: Report the following:

1. Material sources.
2. Gradation.
3. Plasticity index.
4. Liquid limit.

5. Laboratory compaction curves indicating maximum density at optimum moisture content.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Regularly installs specified products.
   2. Installed specified products with satisfactory service on five similar installations.
      a. Project Experience List: Provide contact names and addresses for completed projects.

B. Land Surveyor: Professional land surveyor or engineer registered to provide land surveys in jurisdiction where project is located.

C. Preconstruction Testing:
   1. Engage independent testing laboratory to perform tests and submit reports.
      a. Deliver samples to laboratory in number and quantity required for testing.
   2. Concrete mix design.

1.7 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.

B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, and manufacture date.

C. Deliver steel reinforcement to prevent damage.

D. Before installation, return or dispose of products with damaged or opened packaging and distorted or damaged steel reinforcement.

E. Bulk Products: Deliver bulk products away from buildings, utilities, pavement, and existing turf and planted areas. Maintain dry bulk product storage away from contaminants.

1.8 STORAGE AND HANDLING

A. Store products indoors in dry, weathertight facility.

B. Protect products from damage during handling and construction operations.

1.9 FIELD CONDITIONS

A. Place concrete as specified under Article 3.4 E., for Cold Weather Placement and Article 3.4 D., for Hot Weather Placement of Section 03 30 53, SHORT FORM CAST-IN-PLACE CONCRETE.

1.10 WARRANTY

A. Warranty of Construction

PART 2 – PRODUCTS

2.1 CONCRETE

A. Concrete: Type C, air-entrained as specified in Section 03 30 53, SHORT FORM CAST-IN-PLACE CONCRETE, except as follows:

TYPE	MAXIMUM SLUMP*
Curb & Gutter	75 mm (3 inches)
Pedestrian Pavement	75 mm (3 inches)
Vehicular Pavement	50 mm (2 inches) (Machine Finished) 100 mm (4 inches) (Hand Finished)
Equipment Pad	75 to 100 mm (3 to 4 inches)
* For concrete to be vibrated: Slump as determined by ASTM C143/C143M. Tolerances as established by ASTM C94/C94M.	

2.2 REINFORCEMENT

A. Steel Reinforcement: Type, amount, and locations as shown on drawings and as specified.

B. Welded Wire-Fabric: AASHTO M55M/M55.

C. Dowels: Plain steel bars complying with AASHTO M31M/M31.

D. Tie Bars: Deformed steel bars complying with AASHTO M31M/M31.

2.3 SELECT SUBBASE (WHERE REQUIRED)

A. See Geotechnical report.

2.4 FORMS

A. Forms: Metal or wood, straight and suitable in cross-section, depth, and strength to resist springing during depositing and consolidating of concrete.

B. Tolerance: 3 mm (1/8 inch) maximum variation from straight line in any 3000 mm (10 foot) long section, in either a horizontal or vertical direction.

C. Wood Forms: Minimum 50 mm (2 inches) thick (nominal), free from warp, twist, loose knots, splits, or other defects. Provide approved flexible or curved forms for forming radii.

2.5 CONCRETE CURING MATERIALS

A. Concrete Curing Materials: Comply with one of the following:

1. Burlap: AASHTO M182, weighing 233 g/sq. m (7 oz./sq. yd.) dry.
2. Impervious Sheeting: AASHTO M171.
   a. Polyethylene: Minimum 0.1 mm (4 mils) thick.
3. Liquid Membrane Curing Compound: AASHTO M148 Type 1, without paraffin or petroleum.

2.6 EXPANSION JOINT FILLERS

A. Expansion Joint Filler: AASHTO M213.

2.7 ACCESSORIES

A. Equipment and Tools: Obtain COR's approval of equipment and tools for handling materials and performing work before work begins. Maintain equipment and tools in satisfactory working condition at all times.

B. Sealants:

1. Concrete Paving Expansion Joints: ASTM D5893/D5893M, Type SL, single component, self-leveling, silicone joint sealant.
2. Concrete Paving Joints: ASTM D6690, Type IV, hot-applied, single component joint sealant.

C. Concrete Protective Coating: AASHTO M233 linseed oil mixture.

2.8 CEMENT, SAND, AGGREGATES AND OTHER ADDITIVES

A. Cement, Sand and Aggregate Color: As required to match paver colors.

B. Provide silicon carbide or aluminum oxide grains as required to match paver colors.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine and verify substrate suitability for product installation.

B. Protect existing construction and completed work from damage.

C. Prepare, construct, and finish subgrade as specified in Section 31 20 00, EARTH MOVING.

D. Maintain subgrade in smooth, compacted condition, complying with required section and established grade until succeeding operation has been accomplished.

3.2 SETTING FORMS

A. Form Substrate:

1. Compact form substrate to uniformly support forms along entire length at grade as shown on drawings.
2. Correct substrate imperfections or variations by cutting or filling and compacting.

B. Form Setting:
1. Set forms sufficiently in advance of concrete placement to permit performance and approval of operations required with and adjacent to form lines.
2. Set forms to indicated line and grade and use stakes, clamps, spreaders, and braces to prevent movement in any direction.
3. Tolerances: Conform to line and grade with 3 mm (1/8 inch) tolerance when checked with straightedge, with maximum 6 mm (1/4 inch) deviation from true line at any point.
4. Remove forms when removal will not damage concrete and when required for finishing.
5. Clean and oil forms before each use.

C. Land Surveyor: Establish and control alignment and form grade elevations or concrete slipforming machine operations.
1. Make necessary corrections to forms immediately before placing concrete.
2. When any form has been disturbed or any subgrade or subbase has become unstable, reset and recheck form before placing concrete.

3.3 PLACING REINFORCEMENT

A. Keep reinforcement free of dirt, oil, rust, scale or other substances preventing concrete bond.
B. Install reinforcement as shown on drawings.
C. Support and securely tie reinforcing steel to prevent displacement during concrete placement.
D. Obtain COR's approval of reinforcement placement before placing concrete.

3.4 PLACING CONCRETE - GENERAL

A. Preparation:
1. Obtain COR's approval.
2. Remove debris and other foreign material from between forms.
3. Uniformly moisten subgrade, base, or subbase without standing water.

B. Convey concrete from mixer to final location without segregation or loss of ingredients. Deposit concrete to minimize handling.

C. During placement, consolidate concrete by spading or vibrating to minimize voids, honeycomb, and rock pockets.
   1. Vibrate concrete against forms and along joints.
   2. Avoid excess vibration and handling causing segregation.
D. Place concrete continuously between joints without bulkheads.
E. Install construction joint whenever concrete placement is suspended for more than 30 minutes and at end of each day's work.
F. Workmen or construction equipment coated with foreign material will not be permitted to walk or operate in concrete during placement and finishing operations.

3.5 PLACING CONCRETE FOR CURB AND GUTTER

A. Place concrete in one layer conforming to cross section shown on drawings after consolidating and finishing.
B. Deposit concrete near joints without disturbing joints. Do not place concrete directly onto joint assemblies.
C. After concrete has been placed in forms, use a strike-off guided by side forms to bring surface to proper section to be compacted.
D. Consolidate concrete thoroughly by tamping and spading, or with approved mechanical finishing equipment.
E. Finish concrete surface to grade with wood or metal float.
F. Construct concrete pads and pavements with sufficient slope to drain, preventing standing water.

3.6 PLACING CONCRETE FOR VEHICULAR PAVEMENT

A. Deposit concrete into forms as close as possible to its final position.
B. Place concrete rapidly and continuously between construction joints.
C. Strike off concrete and thoroughly consolidate with finishing machine, vibrating screed, or by hand-finishing.
D. Finish surface to elevation and crown as shown on drawings.
E. Deposit concrete near joints without disturbing joints. Do not place directly onto joint assemblies. Do not place adjacent lanes/areas without COR's approval.
F. Curb-Forming Machines: Curb-forming machines for constructing curbs and gutter will be approved based on trial use on project. If equipment produces unsatisfactory results, discontinue use and accomplish work by hand method construction as specified. Remove unsatisfactory work and reconstruct full length between regularly scheduled joints. Legally dispose of removed portions off project site.

3.7 CONCRETE FINISHING - GENERAL

A. Follow operation sequence below, unless otherwise indicated on drawings:
   1. Consolidating, floating, straight-edging, troweling, texturing, and joint edging.
   2. Maintain finishing equipment and tools in clean and approved condition.

3.8 CONCRETE FINISHING - CURB AND GUTTER

A. Gutter and Curb Top:
   1. Round edges of gutter and curb top with edging tool to 6mm (1/4 inch) radius or as otherwise shown on drawings.
   2. Float surfaces and finish with smooth wood or metal float until true to grade and section and uniform texture.
   3. Finish surfaces longitudinally, while still wet, with bristle type brush.
B. Curb Face:
   1. Remove curb form and immediately rub curb face with wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed.
   2. Brush curb face, while still wet, to match gutter and curb top.
C. Tolerances: Except at grade changes or curves, when tested with 3000 mm (10 foot) straightedge.
   1. Variation from Indicated Plane and Grade:
      a. Gutter: Maximum 3 mm (1/8 inch).
      b. Curb Top and Face: Maximum 6 mm (1/4 inch).
D. Replace curbs and gutters within joint boundary when curbs and gutters exceed specified tolerances.
E. Correct depressions causing standing water.
F. Visible surfaces and edges of finished curb and gutter to be free of blemishes, form marks, and tool marks, and uniform in color, shape, and appearance.

3.9 CONCRETE FINISHING PEDESTRIAN PAVEMENT

A. Flower Water Stations:
   1. Finish concrete surfaces to grade and cross section with metal float, troweled smooth and finished with a broom moistened with clear water.
   2. Broom surfaces transverse to traffic direction.

3. Carefully finish slab edges, including at formed joints, with edger with radius as shown on drawings.
4. Unless otherwise indicated, edge transverse joints before brooming. Use brooming to eliminate flat surface produced by edger. Produce uniform corrugations, maximum 2 mm (1/16 inch) deep.
5. Provide surface uniform in color and free of surface blemishes, form marks, and tool marks.
6. Paving Tolerances:
   a. Variation from Indicated Plane: Maximum 5 mm in 3000 mm (3/16 inch in 10 feet).
   b. Variation from Indicated Thickness: Maximum 6 mm (1/4 inch).
7. Replace paving within joint boundary when paving exceeds specified tolerances.

B. Longitudinally float pavement surface with float minimum 3000 mm (10 feet) long and 150 mm (6 inches) wide, properly stiffened to prevent flexing and warping. Operate float from foot bridges in sawing motion parallel to direction in which pavement is being laid from one side of pavement to the other, and advancing maximum half float length.

C. After longitudinal floating, but while concrete is still plastic, eliminate minor irregularities in pavement surfaces by metal floats, 1500 mm (5 feet) long, and straightedges, 3000 mm (10 feet) long. Make the final finish and float entire pavement surface with straightedges.

D. Test surface trueness with 3000 mm (10 foot) straightedge successively held parallel and at right angles to direction in which pavement is being laid and entire area, as required, to detect variations. Advance straightedge along pavement in successive stages of maximum one half straightedge length. Correct irregularities and refinish surface.

E. Pavement Tolerances:
   1. Variation from Indicated Plane: Maximum 6 mm in 3000 mm (1/4 inch in 10 feet) tested parallel and perpendicular to traffic direction at maximum 1500 mm (5 feet) intervals.
   2. Variation from Indicted Thickness: Maximum 6 mm (1/4 inch).

F. Finish pavement edges and joints with edging tool.

G. Broom finish concrete surface after bleed water dissipates and before concrete hardens with approved fiber broom, minimum 450 mm (18 inches) wide.

1. Gently broom surface transverse to traffic direction from edge to edge.
   a. Use brooming to eliminate flat surface produced by edger.
   b. Produce uniform corrugations, maximum 3 mm (1/8 inch) deep.

H. Align finish surfaces where new and existing pavements abut.

3.10 JOINTS - GENERAL

A. Place joints, where shown on drawings.
   1. Conform to details shown.
   2. Install joints perpendicular to finished concrete surface.

B. Make joints straight and continuous from edge to edge of pavement.

3.11 CONTRACTION JOINTS

A. Cut joints to depth as shown with grooving tool or jointer of radius as shown on drawings or by sawing with blade to produce required width and depth.

B. Construct joints in curbs and gutters by inserting 3 mm (1/8 inch) steel plates conforming to curb and gutter cross sections.
   1. Keep plates in place until concrete can hold its shape.

C. Finish joint edges with edging tool having radius as shown on drawings.

D. Score pedestrian pavement with standard grooving tool or jointer.

3.12 EXPANSION JOINTS

A. Form expansion joints with preformed expansion joint filler material of thickness shown on drawings.
   1. Without dowels, locate joints around perimeter of structures and features abutting site work concrete.
   2. Create complete, uniform separation between structure and site work concrete.

B. Extend expansion joint material full depth of concrete with top edge of joint filler below finished concrete surface where sealant is indicated on drawings.

C. Cut and shape material matching cross section.

D. Anchor with approved devices to prevent displacing during placing and finishing operations.

E. Round the edges of joints with an edging tool.

3.13 CONSTRUCTION JOINTS

A. Locate longitudinal and transverse construction joints between slabs of vehicular pavement as shown on drawings.

B. Place transverse construction joints of type shown, where indicated, and whenever concrete placement is suspended for more than 30 minutes.

C. Provide butt-type joint with dowels in curb and gutter if joint occurs at planned joint location.

D. Provide keyed joints with tiebars if joint occurs in middle third of typical curb and gutter joint interval.

3.14 FORM REMOVAL

A. Keep forms in place minimum 12 hours after concrete placement. Remove forms without damaging concrete.

B. Do not use bars or heavy tools against concrete to remove forms. Promptly repair damaged concrete found after form removal.

3.15 CONCRETE

A. Concrete Protection:

1. Protect unhardened concrete from rain and flowing water.
2. Ensure sufficient curing and protection materials are available and ready for use before concrete placement begins.
3. Protect concrete to prevent pavement cracking from ambient temperature changes during curing period.
   a. Replace pavement damaged by curing method allowing concrete cracking.
   b. Employ another curing method as directed by COR.

B. Cure concrete for minimum 7 days by one of the following methods appropriate to weather conditions preventing moisture loss and rapid temperature change:

1. Burlap Mat: Provide minimum two layers kept saturated with water during curing period. Overlap mats minimum 150 mm (6 inches).
2. Impervious Sheeting: Provide waterproof paper, polyethylene-coated burlap, or polyethylene sheeting.
   a. Wet exposed concrete surface with fine water spray and cover with sheet materials.
   b. Overlap sheets minimum 300 mm (12 inches).
   c. Securely anchor sheet materials preventing displacement.

C. Liquid Membrane Curing Compound:

1. Protect joints indicated to receive sealants preventing contamination from curing compound.
2. Insert moistened paper or fiber rope into joint or cover joint with waterproof paper.

3. Apply curing compound before concrete dries.
4. Apply curing compound in two coats at right angles to each other.
5. Application Rate: Maximum 5 sq. m/L (200 sq. ft./gal.), both coats.
6. Immediately reapply curing compound to surfaces damaged during curing period.

3.16 FIELD QUALITY CONTROL

A. Field Tests: Performed by testing laboratory specified in Section 01 45 29, TESTING LABORATORY SERVICES.
   1. Concrete: Testing specified in Section 03 30 53 SHORT FORM CAST-IN-PLACE CONCRETE.
      a. Delivery samples.
      b. Field samples.
   2. Slip Resistance: Steps and pedestrian paving.

3.17 CLEANING

A. After completing curing:
   1. Remove curing material, except liquid membrane.
   2. Sweep the concrete clean.
   3. Seal all joints after removing foreign matter from joint.
   4. Clean concrete of debris and construction equipment as soon as curing and joint sealing have been completed.
B. Remove and legally dispose of debris, rubbish, and excess material from project site.

3.18 PROTECTION

A. Protect exterior improvements from traffic and construction operations.
   1. Prohibit traffic on paving for minimum seven days after placement, or longer as directed by COR.
B. Remove protective materials immediately before acceptance.
C. Repair damage.
   1. When directed by COR, replace concrete containing cracking, fractures, spalling, and other defects within joint boundary, at no additional cost to Government.

- - - E N D - - -

SECTION 32 12 16
ASPHALT PAVING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Composition, mixing, and construction on prepared subgrade and protection of hot asphalt concrete pavement.

1.2 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. American Association of State Highway and Transportation Officials (AASHTO):

1. 2016 – Standard Specifications for Transportation Materials and Methods of Sampling and Testing, and AASHTO Provisional Standards.
2. M320-10 – Performance-Graded Asphalt Binder.
3. T283-14 – Resistance of Compacted Asphalt Mixtures to Moisture-Induced Damage.

C. Asphalt Institute:

1. Specification SS2.

D. ASTM International (ASTM):

1. C29/C29M-16 – Bulk Density ("Unit Weight") and Voids in Aggregate.
2. C977-10 – Quicklime and Hydrated Lime for Soil Stabilization.
3. D3786/D3786M-13 – Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method.
4. D4355/D4355M-14 – Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.
5. D4632/D46323M-15a – Grab Breaking Load and Elongation of Geotextiles.
6. D6390-11 – Draindown Characteristics in Uncompacted Asphalt Mixtures.

E. National Asphalt Paving Association (NAPA):

1. PS-33 (2009) – Porous Asphalt Pavements.

1.3 PREINSTALLATION MEETINGS

A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this section.

1. Required Participants:
   a. Contracting Officer's Representative (COR).

b. Contractor.

c. Installer.

2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.

a. Installation schedule.

b. Installation sequence.

c. Preparatory work.

d. Protection before, during, and after installation.

e. Installation.

f. Terminations.

g. Transitions and connections to other work.

h. Inspecting and testing.

i. Other items affecting successful completion.

3. Document and distribute meeting minutes to participants to record decisions affecting installation.

1.4 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Test Reports: Certify products comply with specifications.

1. Aggregate Base Course.

2. Porous Asphalt and Asphalt Base/Surface Course.

3. Job-mix formula.

C. Certificates: Certify products comply with specifications.

1. Asphalt prime and tack coat material complying with State Highway Department requirements.

2. Asphalt cement complying with State Highway Department requirements.

3. Job-mix certification that mix equals or exceeds State Highway Specification.

D. Qualifications: Substantiate qualifications comply with specifications.

1. Manufacturer with project experience list.

2. Land Surveyor.

E. One copy of State Highway Department Specifications (Latest Edition).

F. Provide MSDS (Material Safety Data Sheets) for all chemicals used on ground.

G. Geogrid

1. Product Specification

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Regularly manufactures specified products.
   2. Manufactured specified products with satisfactory service on five similar installations for minimum five years.

B. COR to have access to all parts of material producing plants to check mixing operations and materials and adequacy of equipment.

C. Land Surveyor: Professional land surveyor or engineer registered to provide land surveys in jurisdiction where project is located.

D. Preconstruction Testing:
   1. Engage independent testing laboratory to perform tests and submit reports.
   2. Asphalt Base Course:
      a. Test sources, gradation, liquid limit, plasticity index, percentage of wear, and other properties required by State Highway Department.
   3. Porous Asphalt and Asphalt Base/Surface Course:
      a. Test aggregate source, gradation, soundness loss, percentage of wear, and other properties required by State Highway Department.
   4. Job Mix Formula:
      a. Test per required by State Highway Department.

1.6 FIELD CONDITIONS

A. Environment:
   1. Do not begin asphaltic concrete material placement when atmospheric temperature is below 10 degrees C (50 degrees F), nor during fog, rain, or other unsuitable conditions.

1.7 WARRANTY

A. Warranty of Construction

PART 2 - PRODUCTS

2.1 ASPHALT PAVING AGGREGATES

A. Aggregates: Crushed stone, gravel, sand, or other sound, durable mineral materials processed and blended, and naturally combined.

B. Subbase Aggregate: Maximum 38 mm (1-1/2 inches).

C. Base Aggregate Maximum Size: Follow TxDOT Item 247, Type A, Grade 1-2.

D. Asphaltic Base Course:
   1. Maximum Particle Size: 25 mm (1 inch).
   2. If conflicts between this specification and requirements in latest version of State Highway Specifications, State Specifications take precedence.

2.2

2.2 GEOGRID

A. Comply with Geotechnical report. Punched polypropylene sheet with the following properties:
   1. Rib pitch dimension of 1.6 inches longitudinally and diagonally.
   2. Mid-rib depth dimension of 0.05 inches diagonally and transversely.
   3. Mid-rib width dimension of 0.04 inches diagonally and 0.05 inches transversely.
   4. Rectangular rib shape.
   5. Triangular aperture shape.

2.3 ASPHALTS

A. Comply with Geotechnical report.
   1. Asphalt cement: Penetration grade 70-22 or higher performance grade.
   2. Tack coat: Uniformly emulsified, grade SS-1H.

PART 3 - EXECUTION

3.1 PREPARATION

A. Land Surveyor to establish and control pavement (aggregate or asphalt base course and asphalt surface course) alignments, grades, elevations, and cross sections as shown on Drawings.

3.2 MIXING ASPHALTIC CONCRETE MATERIALS

A. Provide hot plant-mixed asphaltic concrete paving materials.
   1. Temperature leaving plant: 143 degrees C (290 degrees F) minimum, 160 degrees C (320 degrees F) maximum.
   2. Temperature at time of placing: 138 degrees C (280 degrees F) minimum.

3.3 SUBGRADE

A. Shape to line and grade and compact with self-propelled rollers.
B. Fill depressions developed under rolling with acceptable material and re-roll area.
C. Remove soft areas, fill with acceptable materials and re-roll area.

D. If subgrade becomes rutted or displaced before the placing of subbase, rework subgrade to bring to line and grade.

E. Proof-roll subgrade with maximum 45 tonne (50 ton) gross weight dump truck as directed by COR. If pumping, pushing, or other movement is observed, rework area to provide stable and compacted subgrade.

3.4 BASE COURSES

A. Subbase:

1. Spread and compact to thickness shown on drawings.
2. Begin rolling at sides, continue toward center, and continue until there is no movement ahead of roller.
3. After completion of subbase rolling, no hauling is permitted over subbase, except top course material delivery.

B. Base:

1. Spread and compact to thickness shown on Drawings.
2. Begin rolling sides, continue toward center, and continue until there is no movement ahead of roller.
3. After completion of base rolling, no hauling is permitted over base except top course material delivery.

C. Thickness Tolerance: Compacted thicknesses shown on Drawings within minus 0.0 mm (0.0 inches) to plus 12.7 mm (0.5 inch).

D. Smoothness Tolerance: Lines and grades shown on Drawings within 5 mm in 3 m (3/16 inch in 10 feet).

E. Moisture Content: Only amount required to achieve specified compaction.

3.5 ASPHALTIC CONCRETE PAVING PLACEMENT

A. Remove all loose materials from compacted base.

B. Apply prime coat, and tack coat where required, and allow to dry according to manufacturer’s instructions as approved by Architect.

C. Receipt of Asphaltic Concrete Materials:

1. Do not accept material unless covered with tarpaulin until unloaded, and unless material is minimum 130 degrees C (280 degrees F).
2. Do not begin asphaltic concrete material placement when atmospheric temperature is below 10 degrees C (50 degrees F), nor during fog, rain, or other unsuitable conditions.

D. Spreading:

1. Spread material with minimal handling.
2. For finished paving 76 mm (3 inches) or less, spread in one layer.

E. Rolling:
   1. After material has been spread to proper depth, roll until surface is hard, smooth, unyielding, and true to thickness and elevations shown on drawings.
   2. Roll in minimum two directions until no roller marks are visible.
   3. Finished paving smoothness tolerance:
      a. No depressions which will retain standing water.
      b. Maximum deviation: 3 mm in 1.8 m (1/8 inch in 6 feet).

3.6 SEAL COAT APPLICATION

A. Do not apply seal coat to new asphalt.

3.7 PATCHING

A. Hot Mix Asphalt Pavement: Sawcut patch perimeter and excavate existing pavement to sound base. Excavate rectangular or trapezoidal patches, extending 300 mm (12 inches) into adjacent sound pavement, unless otherwise indicated on drawings. Cut excavation faces vertically. Remove excavated material. Recompact existing aggregate base course to provide new subgrade.

B. Tack Coat: Apply uniformly to vertical and horizontal surfaces abutting area to receive new hot mix asphalt paving at rate of 0.2 to 0.7 L/sq. m. (0.05 to 0.15 gal./sq.yd).
   1. Allow tack coat to cure before applying hot mix asphalt paving.
   2. Avoid smearing or staining adjoining surfaces, remove spillage and clean affected surfaces.

C. Patching: Fill excavated pavement with hot mix asphalt base mix for full thickness of patch; while still hot, compact flush with adjacent pavement surface.

3.8 CLEANING

A. Remove debris, rubbish, and excess material from project site.

3.9 PROTECTION

A. Protect asphaltic concrete paved areas from traffic until sealer is set and cured and does not pick up under foot or wheeled traffic.

B. Repair damage.

- - - E N D - - -

SECTION 32 17 23
PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Thermoplastic pavement markings will be used for all pavement markings; on all surfaces, in form of traffic lanes, parking bays, areas restricted to handicapped persons, crosswalks, and other detail pavement markings.

1.2 RELATED REQUIREMENTS

A. Paint VOC Limits: Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS.

B. Thermoplastic Marking Color: Per design drawings.

C. Thermoplastic markings will consist of the following but not limited to; center lines for all new road, parking and handicap stalls on all new pavement, newly developed cross walks, etc. If the contractor removes any pavement with pavement markings the pavement markings will be replaced in-kind.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. Texas Department of Transportation (TxDOT) Pavement Marking Handbook; section DMS-8220 and others applicable.

1.4 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:

1. Show pavement marking configuration and dimensions.
2. Show international symbol of accessibility at designated parking spaces.

C. Manufacturer's Literature and Data:

1. Description of each product.
2. Application instructions.

D. Samples:

1. Thermoplasitc Markings: (1) representative sample for each color and marking.

E. Certificates: Certify products comply with specifications.

F. Qualifications: Substantiate qualifications comply with specifications.
   1. Installer with project experience list.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Regularly installs specified products.
   2. Installed specified products with satisfactory service on five similar installations for minimum five years.
      a. Project Experience List: Provide contact names and addresses for completed projects.

1.6 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.
B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.
C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.7 STORAGE AND HANDLING

A. Store products indoors in dry, weathertight conditioned facility.
B. Protect products from damage during handling and construction operations.

1.8 FIELD CONDITIONS

A. Environment:
   1. Product Temperature: Minimum 13 degrees C (55 degrees F) for minimum 48 hours before installation.
      a. Surface to be painted and ambient temperature: Minimum 10 degrees C (50 degrees F) and maximum 35 degrees C (95 degrees F).
B. Field Measurements: Verify field conditions affecting traffic marking installation. Show field measurements on Submittal Drawings.

1.9 WARRANTY

A. Warranty of Construction

PART 2 – PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Design paint complying with specified performance:

1. Application: Fed. Spec. TT-P-1952F.

2.2 PRODUCTS - GENERAL

A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.

B. Provide each product from one manufacturer and from one production run.

1. Low Pollutant-Emitting Materials: Comply with VOC limits specified in Section 01 81 11, SUSTAINABLE DESIGN REQUIREMENTS for the following products:

a. Thermoplastics.

2.3 SANDBLASTING EQUIPMENT

A. Air compressor, hoses, and nozzles of proper size and capacity as required for cleaning surfaces to be marked. Compressor to provide minimum 0.08 cu. m/s (150 cfm) of air at pressure of minimum 625 kPa (90 psi) at each nozzle used.

2.4 THERMOPLASTIC MARKINGS

A. TxDOT pavement marking handbook; DMS8220. For obliterating existing markings comply with Fed. Spec. TT-P-1952F.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine and verify substrate suitability for product installation.

1. Allow new pavement surfaces to cure for minimum 14 days before application of marking materials.

B. Protect existing construction and completed work from damage.

C. Clean substrates. Remove contaminants capable of affecting subsequently installed product's performance.

1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or combination of these methods.

2. Completely remove rubber deposits, existing paint markings, and other coatings adhering to pavement with scrapers, wire brushings, sandblasting, mechanical abrasion, or approved chemicals as directed by (Contracting Officer's Representative (COR)).

3. Application of paint conforming to Fed. Spec. TT-P-1952F is an option to removal of existing paint markings on asphalt pavement. Apply black paint in as many coats as necessary to completely obliterate existing markings.

4. Where oil or grease are present on old pavements to be marked, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application.
   a. After cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through new paint.
5. Pavement marking to follow as closely as practicable after surface has been cleaned and dried, but do not begin any marking until COR has inspected surface and gives permission to proceed.

3.2 TEMPORARY PAVEMENT MARKING

A. Apply Temporary Pavement Markings of colors, widths and lengths shown on drawings or directed by COR. Upon COR's direction, remove temporary marking by carefully controlled sandblasting, approved grinding equipment, or other approved method to avoid damaged. As an option, provide approved preformed pressure sensitive, adhesive tape type of temporary pavement marking of required colors, widths and lengths in lieu of temporary painted marking. Remove any unsatisfactory tape type marking and replace with painted markings at no additional cost to Government.

3.3 INSTALLATION - GENERAL

A. Install products according to manufacturer's instructions and approved submittal drawings.
   1. When manufacturer's instructions deviate from specifications, submit proposed resolution for COR consideration.

3.4 PAINT APPLICATION

1. Apply markings per TxDOT pavement marking handbook.

3.5 DETAIL PAVEMENT MARKING

A. Apply Detail Pavement Markings in locations indicated on drawings. Apply International Handicapped Symbol where indicated in parking spaces. Color as shown on drawings. Apply markings for symbol using suitable template that will provide pavement marking with true, sharp edges and ends. Place detail pavement markings of colors, widths and lengths, and design pattern at locations shown on drawings.

3.6 CLEANING

A. Remove excess paint before paint sets.

B. Remove all debris, rubbish and excess material from project site.

3.7 PROTECTION

A. Protect pavement markings from traffic and construction operations.

1. Protect newly painted markings track free.
2. Place warning signs to alert traffic from both directions.
3. Place small flags or other similarly small objects near freshly applied markings at frequent intervals to reduce crossing by traffic.

B. Repair damage.

- - - E N D - - -

SECTION 32 33 00
SITE FURNISHINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Flower-watering stations, including trash receptacles, water spigot, and flower vase container.

1.2 RELATED REQUIREMENTS

A. Materials product data and samples: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Product and Finish Color: Section 09 06 00, SCHEDULE FOR FINISHES.

C. Concrete footings: Section 033000 - CAST-IN-PLACE-CONCRETE.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. ASTM International (ASTM):

1. ASTM A53/A53M-12 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
2. B221-14 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
3. B61-15 - Steam or Valve Bronze Castings.
4. B62-15 - Composition Bronze or Ounce Metal Castings.

C. American Welding Society (AWS):

1. D1.1-2006 - Structural Welding Code - Steel.
2. D1.2-2014 - Structural Welding Code - Aluminum.

D. National Association of Architectural Metal Manufacturers (NAAMM):

1. AMP 500-06 Metal Finishes Manual.

1.4 SUBMITTALS

A. Submittals Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES:

B. Submittal Drawings:

1. Show size, configuration, and fabrication and installation details.
2. Show floral regulations decal content, lettering color and background color.

C. Manufacturer's Literature and Data:

1. Description of each product.

2. Installation instructions.
3. Warranty.

D. Samples:
1. Each Product: 152 mm (6 inch) long, each type and color.
a. Submit quantity required to show full color and texture range.
2. Trash Receptacle, Markers, Benches, Flower Vase Receptacle: Full sized, complete assembly.
3. Approved samples may be incorporated into work.

E. Qualifications: Substantiate qualifications comply with specifications.
1. Manufacturer with project experience list.
2. Fabricator with project experience list.
3. Installer with project experience list.
4. Welders and welding procedures.

1.5 QUALITY ASSURANCE

A. Manufacturer, Fabricator, Installer Qualifications:
1. Regularly manufactures, fabricates, and installs specified products.
2. Manufactured, Fabricated, Installed, specified products with satisfactory service on five similar installations for minimum five years.
a. Project Experience List: Provide contact names and addresses for completed projects.
1) Photographs, drawings and other documents showing character and quality of final installation.

B. Installer Qualifications: Product manufacturer.
1. Regularly installs specified products.
2. Installed specified products with satisfactory service on five similar installations for minimum five years.
a. Project Experience List: Provide contact names and addresses for completed projects.
1) Photographs, drawings and other documents showing character and quality of final installation.

C. Welders and Welding Procedures Qualifications: AWS D1.1/D1.1M. AWS D1.2/D1.2M.

1.6 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.

B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.

C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.7 STORAGE AND HANDLING

A. Store products indoors in dry, weathertight conditioned facility.

B. Protect products from damage during handling and construction operations.

1.8 WARRANTY

A. Construction Warranty: "Warranty of Construction."

B. Manufacturer's Warranty: Warrant, benches, bollards, trash receptacle, flower vase receptacle and water spigots against material and manufacturing defects.

1. Warranty Period: Three years.

PART 2 – PRODUCTS – GENERAL

2.1 PRODUCTS – GENERAL

A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.

B. Provide each product from one manufacturer.

2.2 FLOWER WATERING STATIONS

A. General: Materials, finishes and colors match existing. See drawings.

B. Cast stone post, see Section 04 72 00 CAST STONE MASONRY. Finish and color to match existing.

C. Smooth finish, self-closing Brass Spigot: ADA compliant, spigot paddle operated, maximum 5 lbs. force water flow connection it the irrigation system as shown on the details in the LF sheet series. Haws Model 6252EHLF, or approved equal.

D. Brass Escutcheon Plate: Round, 3” outside diameter x 3/8” thick, finish to match Brass spigot.

E. Curb Stop Valve: Brass body, 300 PSI minimum working pressure. ASTM B-62, female threaded connections with stop and waste feature. Acceptable manufacturers are Ford, Mueller, A.Y. McDonald or approved equal.

F. Pressure Regulator: Use an adjustable, bronze body pressure regulator with integral stainless steel strainer. Spring range 10-125 PSI, 3/4-

inch inlet and outlet. Acceptable manufacturers and models are Apollo Series 36, Watts Model 223, Wilkins Model 600 or approved equal.

G. Copper Pipe: Use Type "K" soft tubing conforming to ASTM Standard B88. Use wrought copper or cast bronze fittings, soldered, flared mechanical, or threaded joint per installation details. Use a 95-percent tin and 5-percent antimony solder.

H. Valve Box: Use concrete rectangular valve box with metal lid. Acceptable manufacturer is Christy, Oldcastle, or approved equal.

I. Filter Fabric: Use a spun polyester 3.5 oz. per square yard landscape fabric.

J. PVC Pipe Riser: Schedule 40. Pipe diameter will be large enough to provide 4 inches of clearance from curb stop and pressure regulator on all sides.

K. Brick: Natural clay or precast paver with a minimum thickness of 2-3/8".

2.3 TRASH RECEPTACLE

A. Trash Receptacles: Match existing.

1. Steel Body Construction:
   a. Vertical Bar: Solid steel, 9.53 mm x 25.4 mm (3/8 x 1 inch).
   b. Horizontal Bands: Solid steel, 6.35 mm x 63.5 mm (1/4 x 2-1/2 inches).
   c. Support Bars: Steel, 9.53 mm x 76.2 mm (3/8 x 3 inches).
   d. Top Ring: Solid steel, 15.88 mm (5/8 inch).
   e. Leveling Feet: 9.53 mm (3/8 inch) diameter threaded steel shaft.
   f. Joints: Fully welded, grind smooth.
2. Capacity: 136 liter (36-gallon).
3. Inner Liner: High-density plastic inner liner, 2.72 kg (6 lbs.) maximum weight.
4. Lids: Manufacturer's standard steel, tapered formed lid and dome, secured with stainless steel aircraft cable and attachments, with self-closing door.
5. Mounting Plate: Standard (1) anchor bolt hole.
6. Identification: Identify trash receptacle with the word "TRASH", material, finish, color, letter style and size as indicated on Drawings.

7. Steel Powder Coat Finish: Manufacturer's standard shot blasted, etched, phosphatized, preheated, and electrostatically polyester, powder coatings, 8-10 mils (200-250 microns) dry film thickness.
   a. Color: To match existing.

2.4 FLOWER VASE RECEPTACLE

A. Materials: To match existing, with special lightweight hinged lid.
   1. Size: As indicated on Drawings.
   2. Finish and Color: Same as trash receptacle, except as follows:
      a. Identification: Identify flower vase receptacles with the word "FLOWER VASES" as indicated on Drawings.
      b. Decal: "Floral Regulations" decal, factory applied pressure sensitive vinyl on top of receptacle lid as indicated on Drawings. Contents and color approved by Contracting Officer's Representative (COR).

2.5 FINISHES

A. Steel Finish:
   1. Powder-Coat Finish: Manufacturer's standard two-coat finish system consisting of the following:
      a. One coat primer.
      b. One coat thermosetting topcoat.
      c. Dry-film Thickness: 0.05 mm (2 mils) minimum.
      d. Color: Match existing.
B. Aluminum Anodized Finish: NAAMM AMP 500.
   1. Clear Anodized Finish: AA-C22A41; Class I Architectural, 0.018 mm (0.7 mil) thick.
   2. Color Anodized Finish: AA-C22A42 or AA-C22A44; Class I Architectural, 0.018 mm (0.7 mil) thick.
   3. Clear Anodized Finish: AA-C22A31; Class II Architectural, 0.01 mm (0.4 mil) thick.
   4. Color Anodized Finish: AA-C22A32 or AA-C22A34; Class II Architectural, 0.01 mm (0.4 mil) thick.
C. Aluminum Paint finish:
   1. Baked-Enamel or Powder-Coat Finish: Polyester powder coating. Comply with manufacturer's coating process.
   2. Fluorocarbon Finish: AAMA 2605; 70 percent fluoropolymer resin, 2-coat system.

2.6 ACCESSORIES

A. Primers:

B. Welding Materials: AWS D1.1/D1.1M, type to suit application.

C. Fasteners: Tamper resistant Stainless steel, acorn nut.

D. Anchors:

E. Galvanizing Repair Paint: MPI No. 18.

F. Touch-Up Paint: Match shop finish.

G. Concrete Footing: Comply with SECTION 033000 - CAST-IN-PLACE CONCRETE.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect planned installation materials and locations. Notify COR of any discrepancies in conditions.

1. Verify materials are damage free and compliant with Drawings. Report non-compliance to COR.

3.2 PREPARATION

A. Examine and verify substrate suitability for product installation.

B. Protect existing construction and completed work from damage.

C. Remove and dispose existing benches within committal services shelters 1, 2, 3, 4 and 5 to permit new installation.

D. Correct substrate deficiencies.

1. Fill.
2. Grind.
3. Level.

E. Stake alignment and locations for approval by COR. Verify elements "fit" within location provided.

3.3 INSTALLATION - GENERAL

A. Install products according to manufacturer's instructions and approved submittal drawings.

1. When manufacturer's instructions deviate from specifications, submit proposed resolution for COR consideration.
2. Install items rigid and plumb as indicated on Drawings.

B. Flower Watering Stations:

1. Stake flower watering station location. Obtain COR approval before forming concrete pad. Install concrete pad according to SECTION 033000 - CAST-IN-PLACE CONCRETE.

2. Anchor flower vase container as indicated on Drawings and manufacturer's instructions.

C. Trash Receptacle:

1. Anchor receptacle as indicated on the drawings and manufacturer’s instructions.

D. Flower Watering Stations:

1. Install water spigot assemblies according to manufacturer’s instructions, including pipe, isolation valve, fittings, pressure reducing valve and valve boxes. Install washed stone for splash area and below pressure regulator and curb stop valve. See drawings.

3.4 CLEANING

A. Clean exposed surfaces. Remove contaminants and stains.

B. Polish exposed surfaces.

C. Remove excess material and debris. Clean above ground portions of receptacles and other site improvements.

- - - E N D - - -

SECTION 32 90 00
PLANTING

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. Soils, turf, and landscape materials and accessories.

1.2 RELATED REQUIREMENTS

A. Topsoil Materials, Stripping and Stockpiling: Section 31 20 00, EARTH MOVING.

B. Topsoil Testing: Section 01 45 29, TESTING LABORATORY SERVICES.

C. Erosion control: Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

D. Protection of Tress and Plantings: Section 02 41 10, DEMOLITION AND SITE CLEARING.

E. Topsoil Placement and Compaction Test: Section 31 20 00, EARTH MOVING.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. American National Standards Institute (ANSI) Publications:

1. ANSI Z60.1-2014 - Nursery Stock.
2. ANSI Z133.1-2012 - Tree Care Operations-Pruning, Trimming, Repairing, Maintaining, and Removing Trees and Cutting Brush- Safety Requirements.

C. ASTM International (ASTM):

1. C33/C33M-16-Concrete Aggregates.
2. C136/C136M-14 - Sieve Analysis of Fine and Coarse Aggregates.
3. D698-12 - Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
4. D977-13e1 - Emulsified Asphalt.
5. D2028/D2028M-15 - Cutback Asphalt (Rapid-Curing Type).
6. D2103-15 - Polyethylene Film and Sheeting.

D. Hortus Third, most current edition: A Concise Dictionary of Plants Cultivated in the United States and Canada.

E. National Cemetery Administration (NCA):

1. Handbook 3410 - Integrate Pest Management.
2. Handbook 3420-11 - Turfgrass Maintenance.

F. Turfgrass Producers International (TPI):

1. 2006 Guideline Specifications to Turfgrass Sodding.

G. United States Department of Agriculture (USDA):
   1. Federal Seed Act-2011 - Rules and Regulations of the Secretary of Agriculture.
H. United States Environmental Protection Agency (EPA):
   1. 40 CFR Part 503-1993 - Biosolids Rule.

1.4 PREINSTALLATION MEETINGS

A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this section.
   1. Required Participants:
      a. Senior Resident Engineer (SRE)/Contracting Officer's Representative (COR).
      b. Contractor.
      c. Installer.
   2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.
      a. Inspection of planting materials.
      b. Installation schedule.
      c. Installation sequence.
      d. Preparatory work.
      e. Protection before, during, and after installation.
      f. Installation.
      g. Inspecting.
      h. Environmental procedures.
   3. Document and distribute meeting minutes to participants to record decisions affecting installation.

1.5 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Manufacturer's Literature and Data:
   1. Description of each product.
      a. Sod.
      b. Soil amendments.
      c. Antidesiccant.
      d. Erosion control materials.
      e. Hydro mulch.
      f. Non-Asphaltic Trackifier.

g. Herbicide.

h. Weed Control.

2. Plant list: List of local/regional suppliers for each species to be installed. Include quantities, plant dimension (height x spread) and container/root ball size. Certify in writing, confirmed orders for plants by submitting a Bill of Sale for each plant to be installed. Each plant of the same species will be supplied by one grower only unless otherwise approved by COR.

   a. Requests for substitutions of plants not available in size, quantity or type specified must be made within 30 days after Contract award. Submit written evidence that a specified plant cannot be obtained and has been unobtainable since Contract award.

   b. Substitutions will only be authorized when a plant (or its alternates as specified) is not obtainable and COR, in consultation with District Agronomist, authorizes a change order for use of nearest equivalent obtainable size or variety of plant having same essential characteristics with an equitable adjustment of contract price.

3. Warranty.

C. Samples: Submit before beginning Work of this section:

Inert Mulch	2.3 kg (5 lb.) of each type to be used.
Organic Mulch	2.3 kg (5 lb.) of each type to be used.
Imported Topsoils	2.3 kg (5 lb.) of each type to be used.
Organic Amendments	2.3 kg (5 lb.) of each type to be used.
All pesticides required such as preemergence or post emergence herbicides, insecticides, or fungicides.	EPA approved labeling and MSDS sheet for each such product selected for use.

D. Test reports: Certify products comply with specifications.

1. Imported Topsoil: Provide 2.3 kg (5 lbs.) representative sample from each proposed source for testing, analysis, and approval. Deliver samples to acceptable testing laboratory and have testing report sent directly to COR. Testing reports to include following tests and recommendations according to Association of Official Agricultural Chemists standards:

   a. Soil Composition: USDA particle size analysis indicating percentages of sand, silt and clay, and percent organic matter. Mechanical gradation (sieve analysis) and chemical (pH soluble salts) performed by public extension service agency, State Land Grant College, or certified private testing laboratory. Percentages of clay and silt to be determined by hydrometer.

   b. Percent of organics to be determined by loss on ignition of oven-dried samples. Test samples to be oven-dried to constant weight at 110 degrees C (230 degrees F), plus or minus 5 degrees C (41 degrees F).

   c. Macro and micro nutrient fertility tests as determined by Chemical analysis to include Macro and micro nutrient fertility tests as determined by pH, Salinity (EC), Nitrate Nitrogen, Ammonium Nitrogen, Phosphorus, Potassium, Calcium, Magnesium, Soluble Copper, Zinc, Manganese, Iron, Saturation Extract Boron, Aluminum, Soluble Salts, Exchangeable Sodium Percentage (ESP), Sodium Adsorption Ratio (SAR), and Cation Exchange Capacity (CEC).

   d. Tests, as specified, for gradation, organics, soil chemistry and pH to be performed by testing laboratory retained by National Cemetery Administration as described in Section 01 45 29, TESTING LABORATORY SERVICES.

   e. Include recommendations for soil additives to correct soils deficiencies, as necessary, and for fertilizing and to adjust soil pH to optimum range for warm season turfgrass liming applications to support successful turfgrass growth.

2. Organic Soil Amendment:

   a. Testing: Provide testing by an independent laboratory, with the experience and capability to conduct the testing indicated

following U.S. Composting Council Seal of Testing Assurance (STA) procedures, or equivalent.

b. Soil Amendment Analysis: Provide documentation from supplier that compost has reached a monitored temperature of 140 degrees Fahrenheit for at least one week. Engage an independent soil testing laboratory to test representative samples of compost and provide compost analysis report for the following parameters:
   1) Percent organic matter, percent moisture, percent inerts (foreign matter), pH, soluble salts, and particle size.
   2) Nutrient content, including: Nitrogen (N), Phosphorus (P), Potassium (K), Calcium (Ca), and Magnesium (Mg) and Sulfur s.
   3) Trace Metals, including: Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), and Zinc (Zn).
   4) Maturity Indicator. Provide bioassay results. Provide Carbon-Nitrogen ratio.
   5) Stability Indicator: Provide respiration test results.

3. Amended Soil (in place): Following incorporation of amendments and additives, provide minimum six (6)samples per 3,700 sq. m (40,000 sq. ft.), 150 mm (6 inch) depth by 75 mm (3 inch) diameter core samples of amended soil taken from project site for testing, analysis, and approval. Locate each samples as directed by COR from areas designated to be planted in turfgrass. Deliver samples to testing laboratories and have testing report sent directly to COR. Obtain amended soil sample acceptance before seeding or hydroseeding.

E. Certificates: Certify products comply with specifications.

F. Before delivery, submit notarized certificates for approval to COR attesting that following materials meet specified requirements:
   1. Plant Materials (Department of Agriculture certification by State Nursery Inspector from the state in which the plant material originates declaring material to be free from insects and disease).
   2. Fertilizers: Four certificates of analysis for each type of fertilizer.
   3. Lime.
   4. Gypsum.
   5. Soil Sulfur.

6. Humates.
7. Mycorrhizae.
8. Peat.
9. Seed: Include guaranteed percentages of purity, weed content and germination of seed, and net weight and date of shipment.
10. Sod.
11. Membranes.
12. M-Binder.
13. Hydro Mulching: Number of kilograms (pounds) of materials to be used per liter (gallon) of water.

G. Maintenance Data:
1. Care instructions for each plant material.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:
1. Regularly installs specified materials and products.
2. Installed specified products with satisfactory service on five similar installations for minimum five years.
   a. Project Experience List: Provide contact names and addresses for completed projects.
   b. A member with good standing of either the Professional Landcare Network (PLANET) the AmericanHort.
   c. Maintain an experienced full-time supervisor on Project site when work is in progress.
   d. Installer's field supervisor will have certification in all of the following categories from the Professional Landcare Network and submit one copy of certificate to the COR:
   e. Certified Landscape Technician (CLT) - Exterior, with installation specialty areas, designated CLT-Exterior.
   f. Certified Ornamental Landscape Professional designated COLP.

B. Licenses: Submit licenses to SRE/COR:
1. Arborist: One copy.
2. Pesticide Applicator: License in state of project, commercial.

1.7 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.
B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, production run number, and manufacture date.

C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

D. Bulk Products:

1. Deliver bulk products away from buildings, utilities, pavement, and existing turf and planted areas. Maintain dry bulk product storage away from contaminants. Protect products from weather.
2. Install erosion control materials to prevent erosion or displacement of bulk products.

E. Notify COR of delivery schedule five days in advance, minimum. COR will inspect materials upon arrival. Remove unacceptable plant materials from project site immediately.

F. Protect plants during delivery to prevent damage to root balls or desiccation of leaves.

G. Protect trees during transport by covering root balls and tying branches.

H. Protect sod from drying out.

1.8 STORAGE AND HANDLING

A. Store seeds, soil amendments, fertilizers, and packaged materials in dry locations away from contaminants.

B. Keep sod moist and protect from exposure to wind and direct sunlight.

C. Store plants not installed on day of arrival at project site as follows:

1. Shade and protect plants from wind when stored outside.
2. Heel in bare root plants.
3. Protect plants by covering roots with moist wood chips, shredded bark, peat moss, or similar mulching material.

1.9 FIELD CONDITIONS

A. Perform turfgrass installation operations within following dates, but not before irrigation system installed, tested, and approved.

1. Warm Season Planting: April 15 to October 15.
2. Cool Season Planting: October 15 to April 15.

B. Restrictions: Do not plant when ground is frozen, snow covered, saturated or in otherwise unsuitable condition for planting. Special conditions may exist that warrant variance in specified planting dates or conditions. Submit written request for approval to COR stating special conditions and proposal variance.

1.10 WARRANTY

A. Construction Warranty: "Warranty of Construction."

B. Comply with "Warranty" requirements in Section 00 72 00, GENERAL CONDITIONS, including the following supplements:

1. One Year Plant and Turfgrass Warranty: Warranty begins when Government accepts plants and turfgrass but not before end of Landscape Plant and Turfgrass Establishment Period.
2. Replace any dead plant material and any areas void of turfgrass immediately during warranty period and during an active growing season. One year warranty for replaced plants and turfgrass begins on day replacement work is completed and accepted.
3. Government will inspect replacement plants and turfgrass at end of Warranty period. Replace any dead, missing, or defective plant material and turfgrass immediately and during growing season. Warranty ends on date of this inspection provided work specified in this section is complied.
4. Remove stakes, guys wires/straps at end of one year warranty.

PART 2 – PRODUCTS

2.1 PRODUCTS – GENERAL

A. Provide each product from one source or manufacturer.

B. Plant and Turf Grasses: Comply with the varieties specified or shown in plant list.

C. Warrant plants are true to botanical name as listed in Hortus Third.

D. Maintain equipment, tools and machinery on project site in sufficient quantities and capacity for proper execution of Work.

2.2 ORGANIC SOIL AMENDMENT

A. Organic Soil Amendment: Dark brown or black and capable of enhancing plant growth. Ninety-eight percent of material passes 25 mm (1 inch) screen. No admixture of refuse (i.e. noticeable inert contamination) or materials toxic to plant growth are permitted, free of all woody fibers, seeds, leaf structures, plastic, petroleum products, and toxic and non-organic matter.

1. Acceptable Organic Soil Amendments: Peat moss, humus or peat, and commercially available combinations thereof.

2. Acceptable Compost: Natural organic sources such as food or animal residuals, or yard trimmings.
3. Unacceptable Sole Sources of Organic Matter: Untreated sludge from wastewater treatment plants, fresh manure, sawdust, and immature composts.

B. Minimum Material Requirements:

Test Parameter	**Acceptable Ranges**
Organic Matter	27 to 80 percent
pH	5.5 to 8.5
Ash	20 to 65 percent
Nitrogen	0.4 to 3.5 percent
Phosphorus	0.2 to 1.5 percent
Potassium	0.4 to 1.5 percent
C: N Ratio	25 to 30: 1
CEC	50 to 150 meq/100 g
Heavy Metals	Less than max. limits established by EPA 40 CFR Part 503
Inert Contents	Less than 1 percent by weight
Water-Holding Capacity	150 to 200 percent
Pathogen/Weed Seed Destruction	Proof of EPA minimum heating requirements

C. Topsoil stripped and stockpiled on project site is acceptable provided, after testing and addition of necessary additives, meets above specification. Provide additional Organic Soil Amendment as required to complete work.

D. Provide organic soil amendment in areas with organic matter content below 4 percent that will be seeded, sodded or sprigged after grading activities are completed to create satisfactory topsoil horizon.

E. Spread and incorporate organic soil amendment into finished subgrade at depths indicated on drawings to raise soil organic content to minimum four percent and maximum six percent. Allow for additional depth of organic soil amendment to bring all grades to required finished grades as shown on grading plans.

2.3 TOPSOIL

A. Topsoil: Provide well-graded soil of good uniform quality, natural, friable soil representative of productive soils in project vicinity. Topsoil to be free of subsoil, foreign matter, objects larger than 25 mm (1 inch) in any dimension, toxic substances, weeds and any material or substances that may be harmful to plant growth and have pH value of minimum 6.0 and maximum 7.0, and be best suited to region, climate and plant material specific to project.

B. Obtain material from stockpiles established under Section 31 20 00, EARTH MOVING, subparagraph, Stripping Topsoil that meet general requirements stated above. Amend topsoil not meeting pH range specified by the addition of pH adjusters.

C. When sufficient topsoil is not available on project site to specified depth, provide additional topsoil. Minimum 10 days before topsoil delivery, notify COR of sources from which topsoil will be furnished. Obtain topsoil meeting general requirements stated above and comply with requirements specified in Section 01 45 29, TESTING LABORATORY SERVICES. Amend topsoil not meeting pH range specified by adding pH adjusters.

2.4 INORGANIC SOIL AMENDMENTS

A. Lime: Agricultural limestone, minimum 90 percent calcium and magnesium carbonates. Grind lime fineness, minimum 90 percent passes No. 8 mesh and minimum 25 percent passes No. 100 mesh. Maximum moisture, 10 percent.

1. Dolomitic Lime: Natural, agricultural limestone (calcium and magnesium carbonate), minimum of 20 percent calcium and 11 percent magnesium and as follows:

   a. Screen Analysis: 100 percent passing through No.30 sieve; 70 percent passing through No. 100 sieve; minimum 30 percent passing through No.325 sieve. Provide lime in form of granulated, prilled, dolomitic limestone.

2. Calcitic Lime: Natural, agricultural limestone (calcium carbonate), minimum of 36 percent calcium and as follows:

   a. Screen Analysis: minimum of 100 percent passing through No. 10 sieve; minimum of 80 percent passing through No. 100 sieve. Provide lime in form of granulated, prilled, limestone.

3. Agricultural Gypsum: Finely ground, minimum of 90 percent calcium sulfate, or 85 percent calcium sulfate dihydrate.
4. Sulfur: Granular, biodegradable, minimum of 90 percent sulfur, with a minimum of 99 percent passing through No. 6 sieve and a maximum of 10 percent passing through No. 40 sieve.
5. Iron Sulfate: Granulated ferrous sulfate minimum of 20 percent iron and 10 percent sulfur.
6. Aluminum Sulfate: Commercial grade, unadulterated.
7. Sand: Clean washed river sand, free of calcium, chlorides and other deleterious substances.
8. Humates: Derived from mined Gypsum and with guaranteed minimum analysis; Calcium Sulfate dihydrate ($CaSO4 \bullet 2H20$) 35.00%; Calcium (Ca) 7.00%; Sulfur s 5.00%, plus Humic Acids 1.5% derived from Leonardite. Pelletized product used for ease of application.
9. Mycorrhizae: Endomycorrhizal powder inoculum consisting of the following 4 species blend of propagules of arbuscular mycorrhizal fungi: Glomus intraradices, Glomus mosseae, Glomus aggregatum, and Glomus etunicatum. Minimum 100,000 spores/propagules per pound. The powder particle size will be less than 300 microns (100 percent passing the #50 screen).

2.5 ORGANIC SOIL AMENDMENTS

A. Peat: Natural product of sphagnum moss peat derived from fresh-water site conforming to Fed. Spec. Q-P-166, except as otherwise specified. Shred and granulate peat to pass 13 mm (1/2 inch) mesh screen and condition in storage piles for minimum six months after excavation.
B. Perlite: Horticulture grade.
C. Vermiculite: Horticultural grade, free of any toxic materials.
D. Organic Matter: Commercially prepared compost, composted sufficiently to be free of all woody fibers, seeds, and leaf structures, and free of toxic and nonorganic matter.

2.6 TURFGRASS FERTILIZER

A. Provide commercial grade granular fertilizer, free flowing, uniform in composition, and complying with applicable state and federal regulations. Submit fertilizer manufacturer's warranted statement of analysis. Fertilizer contain minimum 20 percent nitrogen by weight (50 percent from controlled release source such as sulfur coated urea), 5

percent available phosphoric acid, and 15 percent potash. Liquid starter fertilizer for hydro mulch slurry, commercial type with 50 percent of nitrogen from controlled release source.

2.7 MEMBRANES

A. Landscape Fabric: Woven needle-punched polypropylene weighing 113 g/sq. m (4.8 oz./sq. yd.) with 950 liter per minute flow rate per sq. m (90 gal. per minute flow rate per sq. ft.).

2.8 EROSION CONTROL

A. Erosion Control Net: Heavy, twisted jute mesh weighing 1.22 lbs./sq. yd. with openings between strands approximately 1-inches square. Install erosion control net according to manufacturer's instructions.

B. Erosion Control Blanket: Cellulose fiber blanket bonded to 6 mm (1/4 inch) square plastic net weighing 10 kg/100 sq. m (20 lbs./1000 sq. ft.) in 1250 mm (50 inch) wide rolls.

2.9 STAKES AND GUYING STRAPS

A. Anchors: Arrow shaped or auger iron anchors, noncorrosive, sized according to manufacturer's instructions.

2.10 WATER

A. Water: Contains no elements toxic to plant life, obtained from on-site potable water supply as specified in Section 01 00 01, GENERAL REQUIREMENTS, Paragraph, Temporary Services.

2.11
2.11

2.11 SOD

A. Sod: Nursery grown, certified sod as classified in TPI "Guideline Specifications to Turfgrass Sodding." Sod will be Tif 419 Bermuda Grass (Cynodon dactylon (L.) Pers. x Cynodon transvaalensis Burtt Davy).

2.12 HERBICIDES AND OTHER PESTICIDES

A. Properly label and register pesticides with U.S. Environmental Protection Agency. Keep all pesticides in original labeled containers indicating analysis and method of use.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine and verify substrate suitability for product installation.

B. Protect existing construction and completed work from damage.

C. Examine areas to receive planting for compliance with requirements and other conditions affecting performance.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

E. Identify and review all underground utility locations before commencing work and exercise caution when working close to utilities. Notify RE/COR of apparent conflicts with construction and utilities to plan adjustment before installation.

3.2 FINE GRADING AND ORGANIC AND INORGANIC SOIL AMENDMENT INCORPORATION

A. Obtain RE/COR's written approval of previously completed rough grading work before incorporating organic soil amendments.

B. Immediately before dumping and spreading approved organic soil amendment, clean subgrade of stones larger than 50 mm (2 inches) and debris or rubbish and remove from project site. Before spreading organic soil amendment, rip subgrades too compact to drain water or based upon compaction tests with claw 305 mm (12 inches) deep, pulled by bulldozer 610 mm (24 inches') on center, both directions, then regrade surface.

C. Place and uniformly spread soil amendment materials humates and mycorrhizae over approved sub-grades. Apply inorganic soil amendments as recommended by soils report. Apply organic amendments to depth sufficiently greater than specified depth so after natural settlement and light rolling, specified minimum settled depth conform to lines, grades and elevations indicated on drawings. Incorporate soil amendment by disc harrowing, rototilling or other means in uniform manner. Incorporate upon organic matter deep enough to produce finished soil with organic matter content of between 4 and 6 percent. Provide additional organic soil amendment material, after in-place testing and approval, as required for organic matter content and finished grades at no additional cost to Government.

D. Spread organic soil amendment material minimum 100 mm (4 inches) deep to finished grade at disturbed areas outside project limits.

E. Do not handle subsoil or organic soil amendment material when wet or frozen.

F. Set sufficient number of grade stakes to check finished grades. Set stakes in bottom of swales and at top of slopes. Connect contours and spot elevations with even slope.

G. After incorporating soil amendments material into subsoil, prepare by scarifying or harrowing and hand raking. Remove large stiff clods, lumps, brush, roots, stumps, litter and other foreign matter. Remove stones over 38 mm (1-1/2 inch) diameter from amended soil bed. Amended soil also to be free of smaller stones in excessive quantities as determined by COR.

3.3 EXCAVATION FOR PLANTING

A. Compact whole surface with roller or by other suitable means to achieve 88 to 85 percent maximum dry density according to ASTM D698. During compaction process, fill all depressions caused by settling or rolling with additional organic soil amendment. Regrade and roll surface until presenting smooth and even finish corresponding to required grades. Acceptable finished soil grade condition for all new turfgrass areas is "fine textured and firm." Satisfactory firmness test requires surface soil not be fluffy or powdery and able to support weight of average adult person without creating visible depression.

B. Verify location of underground utilities before planting. Repair damaged utility lines. Where lawns have been established before planting, cover and protect before beginning excavations. Protect existing trees, shrubbery, and beds with barricades during project construction.

C. Remove rocks and other underground obstructions to depth necessary to permit proper planting according to Drawings. Where underground utilities, construction, or solid rock ledges are encountered, COR may select other locations for plant material.

3.4 FERTILIZATION OF EXISTING TREES

A. Apply fertilizer to existing trees shown on drawings at rate recommended by soil test. Apply in 300 mm to 450 mm (4 inch to 8 inch) deep holes 40 to 50 mm (1-1/2 to 2 inches) in diameter, made by an earth auger, distributed evenly at maximum 600 mm (2 feet) on center throughout outer half of branch spread zone of each tree. Fertilize to within 100 mm (4 inches) of surrounding grade. Use topsoil to bring

surface up to surrounding grade. When using fertilizer in packet, tablet, or wedge form, apply according to manufacturer's instructions.

3.5 TILLAGE FOR LAWN AREAS

A. Thoroughly rip subgrades minimum 150 mm (6 inches) deep by scarifying, disking, harrowing, or other approved methods. Remove debris and stones on surface larger than 25 mm (1 inch) on surface after tillage. Do not till areas of 3:1 slope ratio or greater. Scarify these areas to 50 mm (1 inch) depth and remove debris and stones.

3.6 FINISH GRADING

A. After ripping subgrade for topsoil/subsoil bonding, spread topsoil evenly to minimum 150 mm (6 inches) deep. Incorporate topsoil at least 50 to 75 mm (2 to 3 inches) into subsoil to avoid soil layering. Spread additional topsoil as required to meet finish grades. Do not spread topsoil when frozen or excessively wet or dry. Correct irregularities in finished surfaces to eliminate depressions. Protect finished lawn areas from damage by vehicular or pedestrian traffic. Complete lawn work only after areas are brought to finished grade.

3.7 APPLICATION OF FERTILIZER AND SOIL AMENDMENTS FOR TURFGRASS AREAS

A. Apply turfgrass fertilizer and adjust soil acidity as recommended by soil test results. Add soil conditioners as specified for suitable topsoil in PART 2.

B. Spread soil amendments as recommended by soil test results.

C. Incorporate soil amendments into soil to minimum 100 mm (4 inches) deep in finish grading operation. Lightly mix starter fertilizer with top 13 mm (1/2 inch) of soil. Immediately restore soil an even condition before seeding or sod placement.

3.8 HYDRO-MULCHING

A. Hydro-Mulching: Mix slow release starter fertilizer and approved wood cellulose mulch material, and tackifier in required amount of water to produce homogenous slurry. Uniformly apply slurry under pressure to deliver recommended quantity of fertilizer per 100 sq. m (1000 sq. ft.).

3.9 SODDING

A. Place sod according to TPI Guideline Specifications for sodding. Lay sod at right angles to slope or the flow of water. On slope areas, start at bottom of slope.

B. Finishing: After sodding, blend edges of sod smoothly into surrounding area. Roll with lightweight roller to eliminate air spaces between sod and firmed soil.

3.10 WATERING

A. Watering: Start watering turfgrass areas immediately after installation at sufficient rate to ensure thorough wetting of soil to minimum 50 mm (2 inches) deep. Supervise watering operation to prevent run-off. Supply necessary pumps, hoses, pipelines, and sprinkling equipment. Repair all areas damaged by water operations. Keep soil surface constantly moist, not wet, until turfgrass plants are well established.

B. Deep water all trees twice each week during Plant Establishment Period, providing water penetration throughout root zone to full depth of planting pits, as verified by COR. Discontinue watering at first hard frost in fall and resume at ground thaw in spring.

3.11 EROSION CONTROL MATERIAL

A. Install and maintain erosion control material on designated areas as shown on drawings. Prepare, fertilize and vegetate areas to be covered, before erosion material is placed. Immediately following planting operations, lay erosion control material evenly and smoothly and in contact with soil throughout. Omit straw mulch from all seeded areas receiving erosion control material.

B. For waterways, unroll erosion control material in direction of water flow. When two or more strips are required to cover ditch area, overlap strips minimum 100 mm (4 inches). For strips to be spliced lengthwise, overlap ends minimum 150 mm (6 inches) with upgrade section on top.

C. On slopes, place erosion control material either horizontally or vertically to slope with edges and ends of adjacent strips butted tightly against each other.

D. Staple each erosion control strip in three rows (each edge and center with center row alternately spaced) with staples spaced maximum 1200 mm (4 feet) longitudinally. For two or more strips side by side on slopes, install common row of staples on adjoining strips. Staple all end

strips at 300 mm (12 inch) intervals at end. Firmly embed staples in underlying soil.

E. Provide erosion control maintenance to repair damage by erosion, wind, or any other cause. Maintain, protect, repair, or replace erosion control material until Termination of the Plant and Warranty Period.

3.12 LANDSCAPE PLANT AND TURFGRASS ESTABLISHMENT PERIOD

A. Landscape Plant and Turfgrass Establishment Period: Begins immediately after installation for all turfgrass and landscape plant material, with RE/COR's approval, and continues through the growing season sufficiently long for 90 days minimum for turfgrass (seed and sod) and 120 days minimum landscape plant materials including all trees (whips and balled and burlapped stock), shrubs, and native grass seeded areas to become established and provide satisfactory to District Agronomist and NCA. In the event that the growing season ends during the duration of the 90 day turfgrass and 120 landscape plant material establishment period, the RE/COR will provide in writing to the contractor indicating the date when the current growing season has been declared as ended and indicate the remaining number of days for the turfgrass and landscape plant material establishment period to continue into the next growing season. The date for the following year’s growing season will be provided by the RE/COR, in writing, and commence immediately following that said date. Conditions and appearance are as follows:

1. Turfgrass has obtained minimum of 98 percent generally weed-free surface cover.
2. Landscape Plant Materials are fully rooted, actively growing and healthy and planting beds generally weed-free.
3. Maintain plant and turfgrass during establishment period.
4. Plants and turfgrass will not be accepted until completion of acceptable establishment period.
5. During Landscape Plant and Turfgrass Establishment Period complete the following:
   a. Water plants and turfgrass to maintain moist soil surface until plants and turfgrass are well established. Quantity of applied water required to achieve and maintain these conditions determined on site by District Agronomist in consultation with COR.

b. Prune plants and replace mulch as required.
c. Replace and restore stakes, guy straps, and eroded plant saucers as required.
d. Remove grass, weeds, and other undesired vegetation, including root growth, before they reach 75 mm (3 inches) high in plant bed and saucers. After all unwanted vegetation has been removed, apply approved preemmergence herbicides and remulch.
e. Spray with approved insecticides and fungicides to control pests and ensure plant survival in healthy growing condition, as directed by COR in coordination with District Agronomist.
f. Provide the following during turfgrass establishment:
   1) Eradicate weeds. Water, fertilize, overseed, and perform other operation necessary to promote growth of turfgrass.
   2) Mow turfgrasses as often as necessary to maintain NCA specified mowing height for each type of turfgrass before final acceptance. Begin mowing when cool season turfgrass is 100 mm (4 inches) high. For warm season turfgrasses, mow at appropriate heights for species and cultivar as directed by COR in consultation with District Agronomist.
g. Replace dead, missing or defective plant material during establishment period and an active growing season. Immediately replace each plant with one of same size and species.
h. Replant areas void of turfgrass during an active growing season only.
i. Sod will be evaluated for species and health thirty (30) days after laying last piece and reevaluated each 15 days during the establishment period. A satisfactory stand of grass plants from sod operation will be living sod, uniform in color and leaf texture. Bare spots to be maximum 1250 sq. mm (2 sq. inches). Joints between sod pieces to be tight and free of weeds and other undesirable growth.
j. Seeding will be evaluated for species and health thirty (30) days after final planting and reevaluated each 15 days during the establishment period. A satisfactory stand of grass plants from seeding operation will be 98 percent coverage uniform in color and leaf texture. Bare spots to be maximum 1250 sq. mm

(2 sq. inches). Reseed unsatisfactory areas within seven days during an active growing season.

k. Complete remedial measures as directed by COR in consultation with District Agronomist to ensure plant and turfgrass survival.

l. Repair damage caused while making plant or turfgrass replacements.

3.13 LANDSCAPE PLANT AND TURFGRASS ACCEPTANCE

A. Landscape plant and turfgrass acceptance will occur after completion of LANDSCAPE PLANT AND TURFGRASS ESTABLISHMENT PERIOD. Contractor to have completed, located, and installed all plants and turfgrass according to drawings and specifications. All plants and turfgrass are expected to be living and in healthy condition at time of inspection and acceptance. Make written request two weeks before final inspection of landscape plants and turfgrass. Upon inspection, when work is found to not meet specifications, PLANT AND TURFGRASS ESTABLISHMENT PERIOD will be extended at no additional cost to Government until work has been satisfactorily completed, inspected and accepted.

B. Criteria for Acceptance of Turfgrass:

1. Sod: Living sod grass plants uniform in color and leaf texture and well rooted into soil below so that gentle pulling of turfgrass leaves by hand does not dislodge sod. Bare spots to be maximum 1250 sq. mm (2 sq. inches). Joints between sod pieces will be tight and free from weeds and other undesirable growth.

3.14 CLEANING

A. Remove and legally dispose of all debris, rubbish, and excess material from project site.

B. Where existing or new turfgrass areas have been damaged or scarred, restore disturbed areas to original condition.

C. In areas where planting and turfgrass work have been completed, clear the area of all debris, spoil piles, and containers.

D. Maintain minimum one paved pedestrian access route and one paved vehicular access route to each building clean at all times.

E. Clear other paved areas when work in adjacent areas are completed.

3.15 PROTECTION

A. Protect plants and turfgrass areas from traffic and construction operations. Erect barricades, as required, and place approved signs at appropriate intervals until final acceptance.

B. Remove protective materials immediately before acceptance.

C. Repair damage.

3.16 ENVIRONMENTAL PROTECTION

A. All work and operations to comply with requirements of Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS.

- - - E N D - - -